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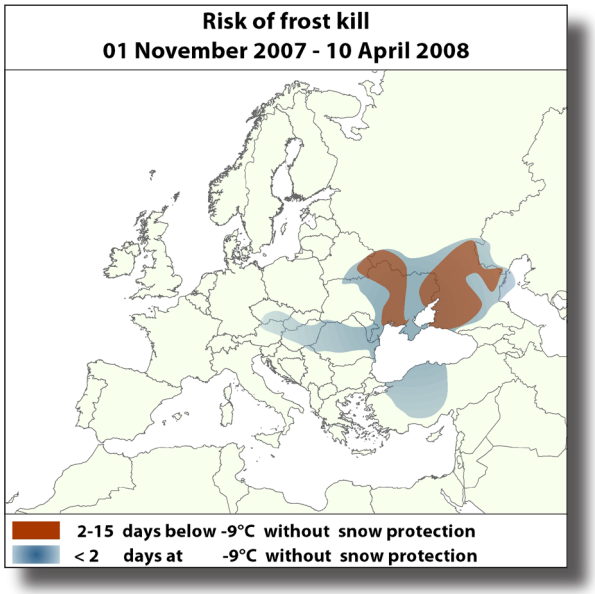
MARS AGROMETEOROLOGICAL Crop Monitoring in Europe

11th November 2007 to 10th April 2008

Vol. 16, No 1

Crops under normal conditions after a mild winter particularly for central and eastern Europe with advanced development. Iberian peninsula and southern France recovering from dry conditions



1. Agrometeorological overview

Generally milder than seasonal conditions, especially in central and eastern Europe, but cooler than the previous campaign. Rain shortage in the Mediterranean basin with worrying conditions particularly in Spain, southern France and the Maghreb (expect Tunisia). No particular problems during winter crop sowings. Brief but harsh frost at the end of March in the central EU (e.g. Germany, Poland, Sweden).

1.1. Temperatures and evapotranspiration

Mild autumn in northern and eastern Europe and slightly cooler than average in western and southern EU. Again followed by a quite mild winter, even if less anomalous compared with the previous winter (except in the Iberian peninsula).

Similarly to the previous campaign, the **autumn** was mainly characterised by milder than seasonal temperatures. These conditions were more prominent in the northern and eastern side of the continent, whilst in the western side (France, Spain, Portugal) more seasonal or slightly cooler than seasonal temperatures were recorded. The most relevant

MARS STAT yield forecasts at EU27

CROPS	European Union 27 Yield (t/ha)				
	2007	2008	Average 5 years	% 2008/07	% 2008/ Average
TOTAL CEREALS	4.5	**4.9**	*4.7*	+8.1	+3.7
Soft wheat	5.1	**5.6**	5.4	+9.1	+3.2
Durum wheat	2.8	**2.9**	*2.7*	+3.0	+6.7
Total wheat	4.8	**5.2**	*5.0*	+8.1	+3.9
Spring barley	3.8	**3.8**	*3.7*	-0.4	+2.9
Winter barley	4.8	**5.3**	*5.0*	+10.7	+7.3
Total barley	4.2	**4.4**	*4.2*	+3.5	+4.1
Grain maize	5.7	**6.5**	*6.3*	+12.9	+2.6
Other cereals [1]	3.2	**3.4**	*3.2*	+6.9	+3.9
Rape seed	2.8	**2.9**	3.0	+2.3	-3.8

Yield figures are rounded to 100 kg

[1] Sorghum, rye, maslin, oats, triticale, mixed grain other than maslin, millet, buckwheat

Sources:

2006 yields come from EUROSTAT CRONOS

2007 yields come from MARS CROP YIELD FORECASTING SYSTEM

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EC publication from JRC/IPSC/Agriculture/AGRI4CAST: mars-stat@jrc.it
MARS bulletin: http://mars.jrc.it/marsstat/bulletins/2008.htm
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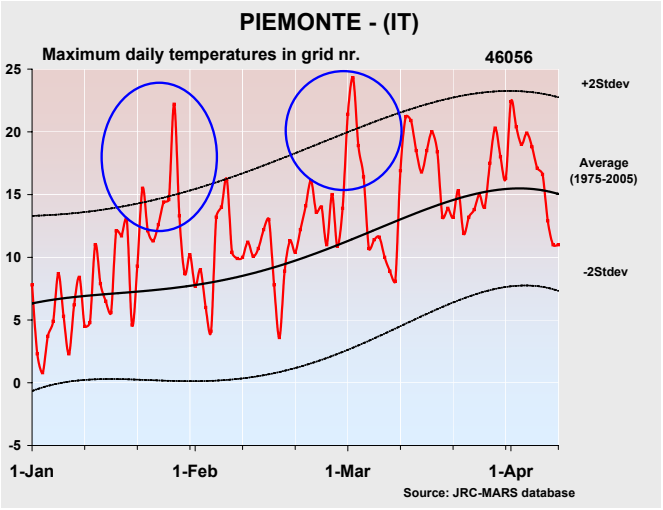

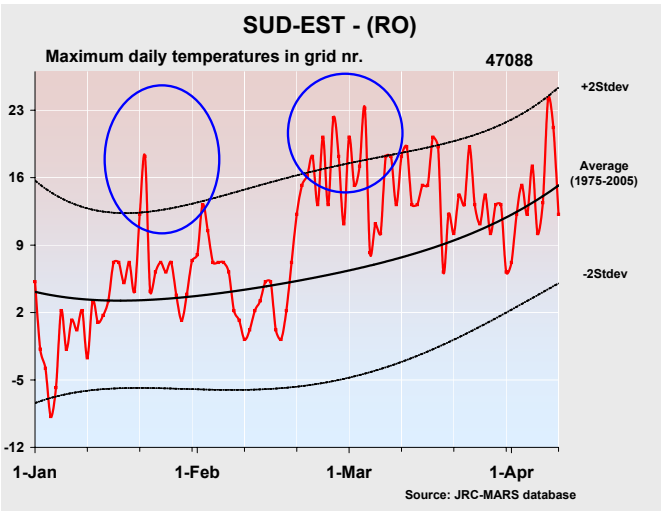

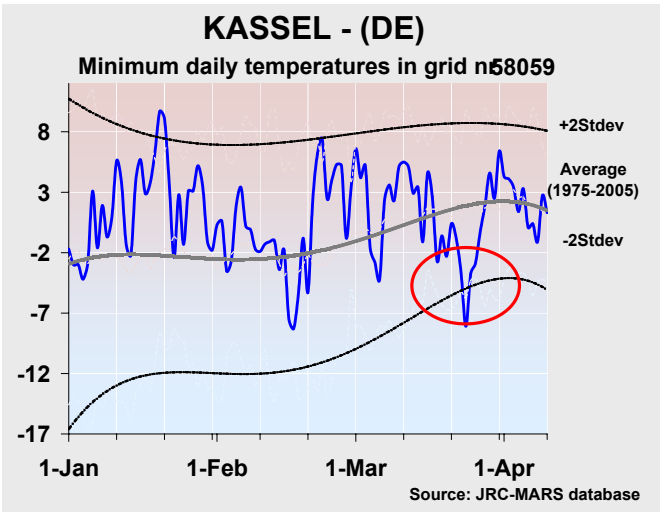

anomalies were recorded in Ireland, the Baltic countries, Denmark, southern Germany, the Czech Republic, Slovakia, Poland and eastern countries where, at the end of December, a surplus of around 50–90° GDD (growing degree days) (as compared with the long-term average — LTA) was accumulated, equivalent in many cases to surpluses of up to 300–400 %. Those surpluses were mainly due to the higher than seasonal minimum daily values recoded during this period. The higher temperatures were favourable to a rapid germination and tilling of the new winter cereals but meanwhile exposed the new plants to a higher risk of frost damage. Fortunately, the frost events which occurred were almost always coupled with a snow cover deep enough to protect the active vegetation.

During the whole **winter**, higher than seasonal temperatures were recorded. And again in central and eastern Europe, the largest deviations from seasonal conditions were recorded: at the end of winter, in northern Germany, Denmark, Poland, Romania, Bulgaria, the Czech Republic, Slovakia, Belarus and Ukraine, the cumulated active temperatures (Tbase = 0 °C) were 250–280° GDD above the seasonal values (equivalent to 150–250 %). Both in absolute and relative terms in the EU territories, in **January** and **February** the warm anomaly was even more significant than in **March**, when more normal conditions occurred in the EU but warmer than average temperatures were recorded mainly in the Black Sea basin. Moreover, cooler than average conditions were not detected anywhere in the continent and this winter was one of the warmest since 1975: similar conditions occurred in 1975, 1998, and warmer conditions occurred only in 1990 and 2007.

Despite the generally higher temperatures and a reduced (as compared with the average) number of frost days recorded, large temperature oscillations occurred in January, February and March. In **January** the maximum daily values showed large deviations above the normal ranges of variation: during the third dekad, anomalous high values (> 10 °C above the average) were recorded in the western EU, namely in northern Italy (22.8 °C), southern Spain (25.5 °C), southern France (22.5 °C) and Portugal (22.7 °C). Similarly, at the beginning of January, minimum daily values largely below average (> 10 °C below the LTA) were recorded in southern Romania (– 26.8 °C), north-east Romania (– 24.2 °C), Bulgaria (– 22.7 °C) and Ukraine (– 25.4 °C). Equally, in **February** and **March** large temperature fluctuations occurred. For example, in February in southern Italy (Sicily, Calabria) and Greece (Peloponnisos, Thessalia, Attiki, Sterea Ellada), very low minimum temperatures (8–10 °C below the LTA) were recorded. However, the largest fluctuations were recorded in the east of the UK (the minimum daily temperature was – 7 °C on 18 February and + 10 °C two days after), the Czech

Abstract

The 1st 2008 printed MARS Bulletin (Vol. 16, No 1) covers meteorological analysis and crop yield forecasts for the period 11 November 2007 to 10 April 2008.

Previous related analysis available:

—Climatic updates, 20/12/2007 to 24/02/2008, (CU2008/1)

—Complete Bulletin, 11/09/2007 to 10/11/2008 (Vol. 15, No 6)

Next printed issue

Vol. 16, No 2: 11 April - 30 April 2008 analysis and forecasts.

Contributions

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MARS stands for Monitoring Agriculture with Remote Sensing.

Technical note:

The long-term average used within this bulletin as a reference is based on an archive of data covering 1975–2007.

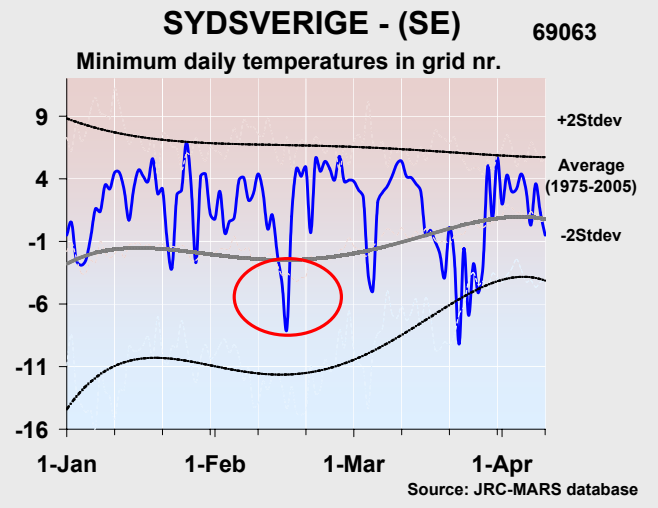
The CNDVI is an unmixed normalised vegetation index on the base of Corine land cover 2000 mainly for arable land or grassland.

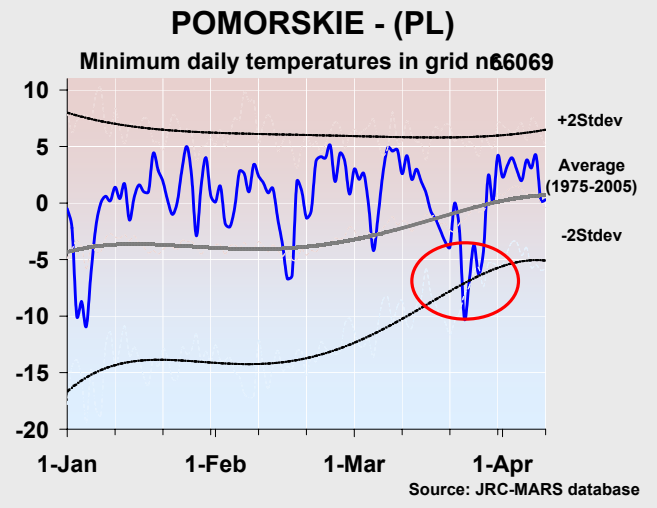
Disclaimer:

The geographic borders are purely a graphical representation and are only intended to be indicative. These boundaries do not necessarily reflect the official EC position.

Republic (– 10.6 °C on 17 February and + 9 °C on 22 February). In **March**, very relevant were also the anomalous maximum daily temperatures (9–10 °C above the seasonal values) recorded during the second half of the month: 22.7 °C in southern Germany, as compared with 12 °C as LTA; 26.5 °C in the Po valley versus 12.5 °C as LTA; 28 °C in Andalusia as compared with 20 °C as LTA; 24.7 °C in south-east Romania versus 15.5 °C as LTA, etc.. A brief but harsh frost occurred in the second half (– 8/– 9 °C in central Germany, northern and southern Poland, eastern Ukraine and southern Sweden).

In the first dekad of **April**, more normal conditions occurred in central and eastern EU, whilst warmer than average temperatures were recorded in the Iberian peninsula and in the eastern countries. The effects of those thermal conditions influenced only marginally the level of potential evapotranspiration, in relation to the relative high temperatures and the modest seasonal level of solar radiation.





1.2. Rain and climatic water balance

In general, a seasonal second half of autumn (except the Iberian peninsula, Italy and Greece with drier than seasonal weather and Bulgaria with wetter). In winter, water shortage in the Mediterranean regions (except Italy and the Balkans), wetter than seasonal in Atlantic countries. Beneficial rain in April in the western Mediterranean.

As a whole, during the considered period, quantitatively the rains were more concentrated in the areas facing onto the Atlantic and in the central EU, whilst they were scarce in the Mediterranean areas; particularly in Spain, central and northern Italy, and Algeria.

In the majority of the continent, the second half of **autumn** was mainly characterised by a generally seasonal water supply: more abundant rains were recorded in Bulgaria, southern Romania and locally in Austria, southern Hungary and central Germany; whilst, on the contrary, very low rain was recorded in the Mediterranean areas. In those areas, the rain during this period is of particular importance, because it is crucial to refill the water soil reservoirs for the whole vegetative cycle of winter crops. Therefore the impacts of water shortage in this period are not immediately visible. The largest **deficits** were recorded in Spain (Castile-Leon, Catalonia, Castile-La Mancha and Aragon where practically no rain was recorded), in central Italy and the Po Valley (140 mm of rain was missing, equivalent to 85 %), southern France (Midi-Pyrénées, Languedoc-Roussillon, deficit > 80 %), Portugal (deficit > 60 %). Of course, in these areas, the climatic water balance values were more largely influenced by the water shortage and, despite low winter crop water consumptions (early stage of development of the active crops), at the end of the year the balance presented worrying values, mainly in southern and eastern Spain.

On the contrary, in the Balkans, in particular in Romania and Bulgaria, a very large **surplus** (> 100 %, equivalent to 70–90 mm), as compared with the LTA, was recorded. Moreover, in southern Spain the few rainy events were even very intense: 130 mm on 20 November in Andalusia, with possible impacts on fields and crops.

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During the **winter**, again the precipitations were more abundant in the central and northern areas whilst the Mediterranean and the Black Sea basins suffered from reduced water supplies. The precipitations were not even equally distributed in time. In general, in **January** the Atlantic rainy fronts brought a large amount of precipitation over the British Isles and Scandinavia, and less than seasonal precipitation was recorded in the central and eastern Mediterranean (southern Italy, Algeria, Tunisia, Greece, Turkey). In **February** precipitations were quite scarce over almost the whole continent (except extreme northern areas): the largest deficits were in northern Spain and Portugal (> 100 mm missing), south-west France, central and southern Italy, western Greece, western Turkey and Algeria. **March** was definitively wetter than seasonal (except in the western Mediterranean, the Black Sea basin and northern Italy): the heaviest rain was recorded in northern France, the British Isles, the Benelux countries, the Pyrénées, Slovenia and central and southern Italy. In these last areas intense showers also occurred locally (in Sicily, 115 mm on 24 March). At the end of March in northern Portugal, southern France, central Italy, Greece, western Turkey and Algeria, more than 150 mm of rain was lacking, with possible negative impacts on winter crops, even considering the more advantageous stage of development normally present in these areas.

In **April** beneficial rains occurred in Spain, Portugal and northern Italy, which almost compensated for the deficit accumulated at the beginning of the year. Therefore, on 10 April, only in north-west and central Italy, north-west Spain, north Portugal, Greece, Algeria, Morocco and western Turkey the climatic water balance showed negative values.

2. Campaign analysis at country level

2.1. EU-27

France: Despite temperature fluctuation, crops are slightly anticipated, Mediterranean area under dry conditions

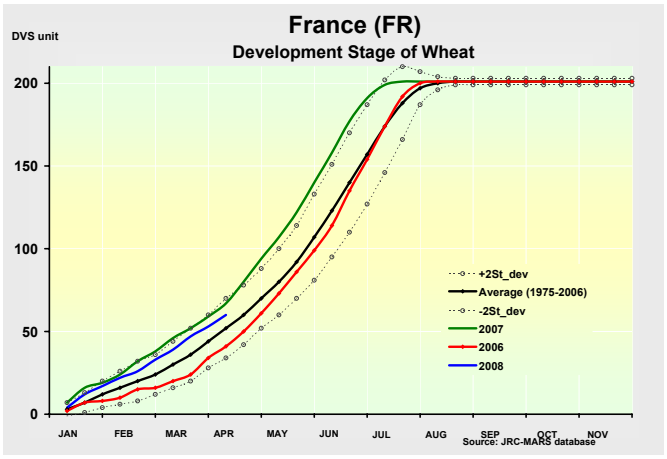
As the conditions allowed a close to normal crop development, soft wheat is forecast at 7.3t/ha: higher than the five-year average (+ 5.1 %) and than last year (+ 13.9 %). Durum wheat reached also a good yield potential with 4.7t/ha (+ 10.3 % on 2007, + 3 % average). The winter barley yield is foreseen with 6.5t/ha (+ 13.1 % on 2007, + 2.5 % average). The rapeseed yield is forecast with 3.2t/ha close to the average (– 0.1 %) and better than 2007 (+ 11.8 %).

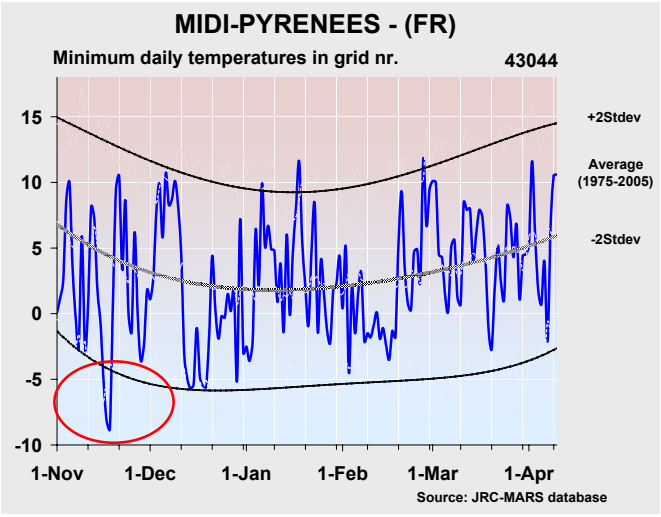
Due to the important temperature fluctuations, France experienced a mild winter from January to mid-March with a higher number of cold days than average. As a consequence, there was a possible crop dehardening that exposed the plant leaves to a late frost reducing the crop development potential.

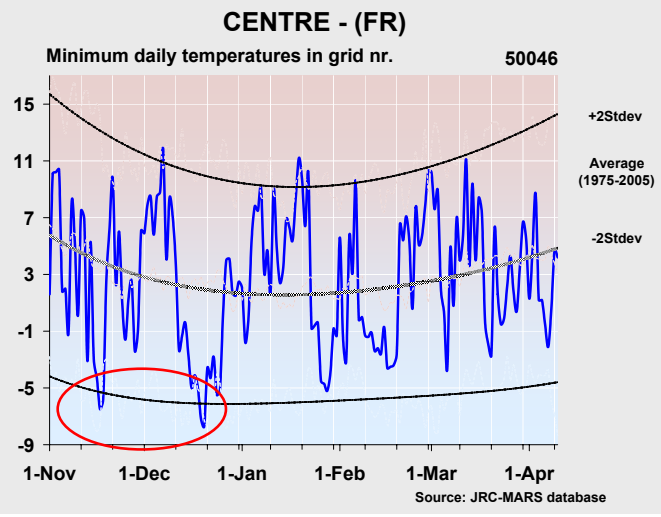
Despite the drop in temperatures at the end of March, most of the winter crops were 10 days in advance compared with the normal stage, at the beginning of April.

After a drier than normal November and February (< – 30 % lower than average) the abundant rainfall of March (> 30 % higher) replenished most of the country's soil moisture, a benefit especially for the south-western deficit. However, the Mediterranean regions did not profit from such rainfall and remained below average, keeping the crops under sub-optimal conditions particularly before a water-demanding growing period.

The early spring sowing of barley should have been done under normal conditions except at the Belgium border where the conditions were wetter.







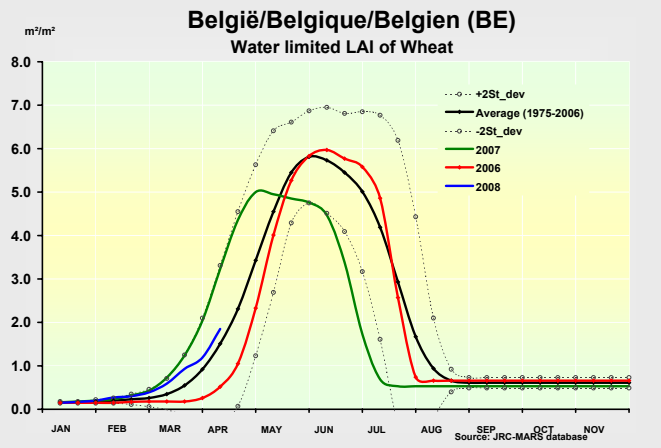
Belgium, the Netherlands and Luxembourg: Mild winter with some temperature drops and good soil moisture

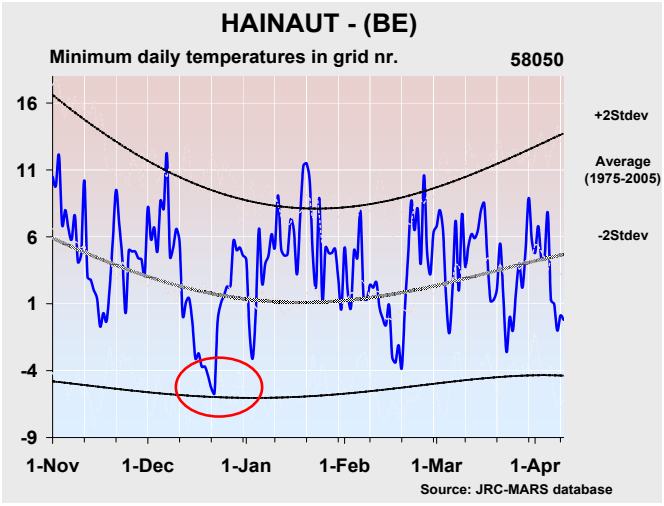
The overall conditions were not exceptional but allow reasonable crop yield expectations. Soft wheat is forecast at 8.6t/ha in Belgium, 8.2t/ha in the Netherlands and 6.1t/ha in Luxembourg. They are all higher than last year's yield, respectively from + 10 %, + 13.9 % to + 9.3 % and compared with the average + 2.8 %, – 2.2 % and + 0.1 %. Winter barley is foreseen at 8.1t/ha in Belgium (+ 1.3 % 2007, + 3.5 % average).

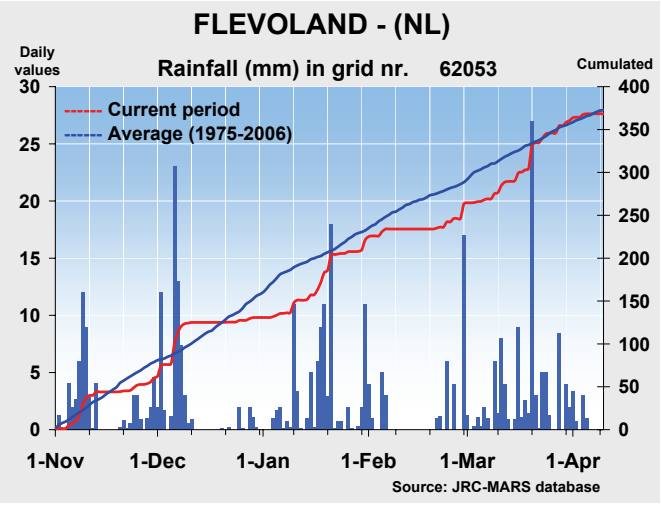
Warmer temperatures from January onward compared with LTA accelerated the vegetation growth compared with the average. However, some minimum drops around – 5 °C at the end of December, end of February, end of March and beginning of April should have partly reduced the leaves' biomass at an advance stage and slowed down crop development. Radiation remained around the seasonal value.

The precipitations in March were quite abundant and the cumulated precipitation from November to April was higher than the average level. As a consequence the soil moisture ended the period with a normal level.

The spring barley sowing should have been made under wet conditions in the Netherlands and in most of Belgium with more than 20 mm higher than usual.







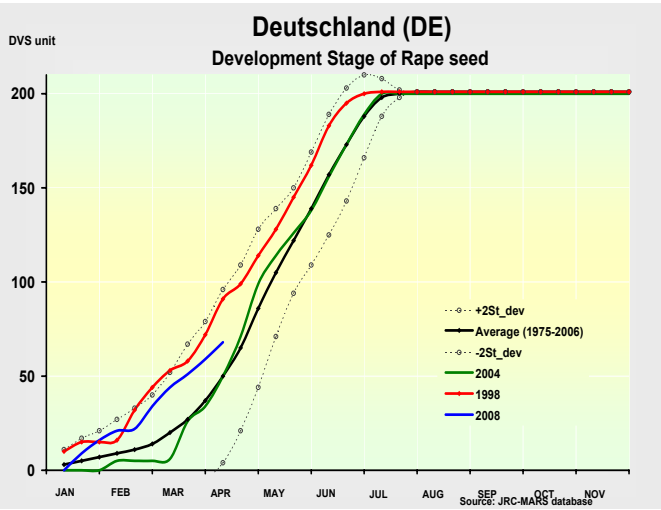
Germany: Mild winter anticipated, crops under optimal soil moisture

As the winter was quite favourable to cereal development, the wheat yield is forecast at 7.4t/ha, a better level than last year (+ 5.9 %) and than the average (+ 1.6 % of the five-year average). Winter barley is also forecast at a good level with 6.5t/ha (+ 4.2 % average, + 11.3 % on 2007). Due to the high yield amplitude, the rapeseed forecast is more conservative with 3.5t/ha, + 1.5 % on last year but at a lower level than average (– 2.7 %).

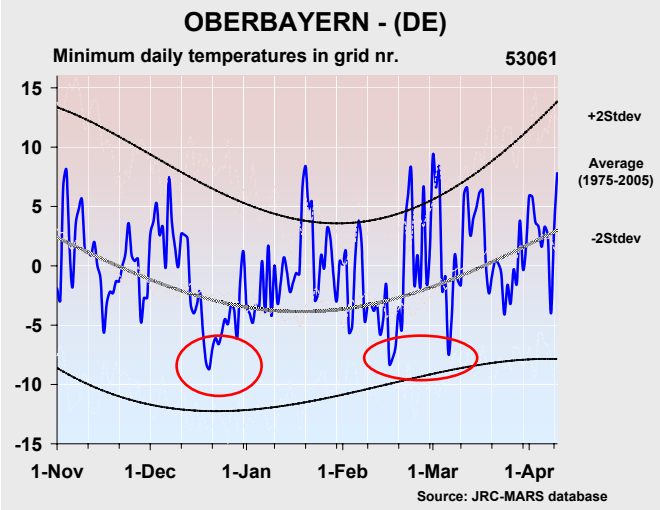
The country experienced a mild winter from December to February with average temperatures 30 % higher than seasonal values. The winter crops' phenology has been driven by a temperature sum, showing an anticipation stage of more than 10 days.

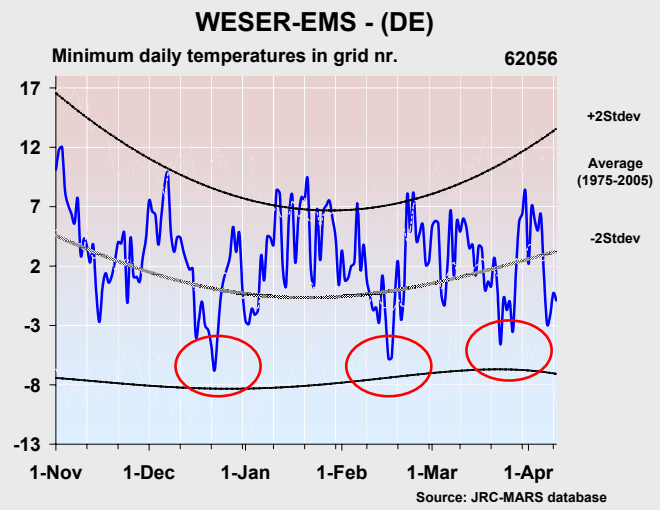
Some big drops in temperature were recorded mainly in December, February, late March and to a lesser extent early April. As a matter of fact, the number of cold days below – 5 °C is higher than usual. The crop biomass could have suffered from these extreme temperatures, particularly after the mild period when hardening is lower. However, the late snow fall should have limited this impact.

December and February were drier or close to the normal precipitation; November and even to a larger extent March were over wet (> 30 % higher). Plants benefited from good soil moisture content, which is optimal for the next growing phase.



The wet March conditions were not optimal for spring sowing and should have hindered the field preparation for spring barley.





UK and Ireland: Mild but wet autumn/winter, with large thermal fluctuations

UK: Yield forecasts are 7.91 t/ha for soft wheat (+ 1.6 % compared with the five-year average), 6.47 t/ha for winter barley (+ 0.6 %), 3.16 t/ha for rapeseed (– 1.6 %) and 5.52 t/ha for spring barley (+ 0.9 %).

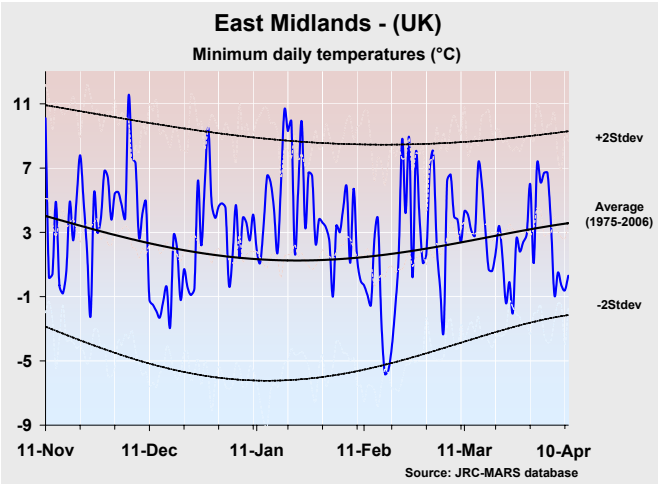
Ireland: Yield forecasts are 8.63 t/ha for soft wheat (– 2.1 % compared with the five-year average), 7.56 t/ha for winter barley (– 3.3 %) and 6.77 t/ha for spring barley (+ 2.9 %).

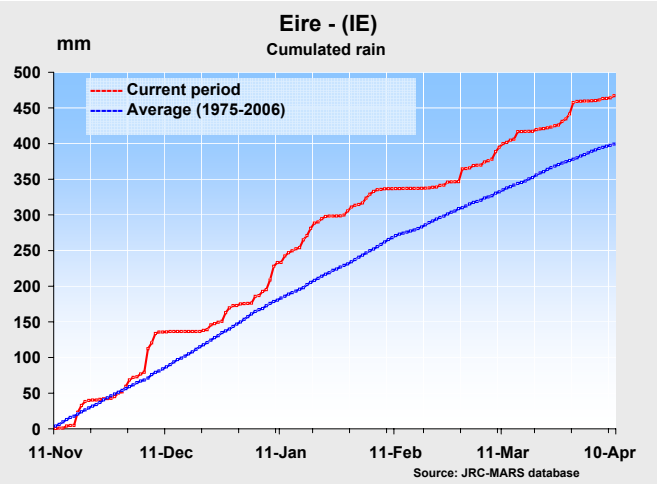
Up to the end of the considered period, the current campaign did not present limiting factors for winter crops, whilst it is likely that the persistent rain in some way affected the spring (barley) sowing in the UK.

However, during the autumn in Ireland the accumulation of active temperatures was generally higher than LTA, both in November and December, although always within the normal range of variation. The UK experienced more seasonal conditions. Nevertheless, in a few days a sudden high peak occurred at the beginning and at the end of December. In this period the precipitations were average both in quantity and distribution.

A similar course characterised the **winter**, with very mild conditions in January and February, when also high unseasonal temperatures (8–9 °C above LTA) were recorded; it was more seasonal in March. To be highlighted is the sudden drop in temperature occurred in mid-February, when the minimum daily values reached values even below – 5/– 6 °C. At the end of the considered period the surplus of the accumulated active temperatures was estimated at 120–150° GDD. As a consequence, crop development was accelerated when compared to normal, but it was less with respect to the previous year. Similar conditions occurred in 1989 and 2000.

During the winter, the rain was more abundant and persistent in January and in the last part of March. A good time window for the preparation of fields' spring sowing occurred in February. However, the persistent rain in March and April maybe disturbed the regularity of spring sowings. Those agrometeorological conditions were also favourable for pasture.

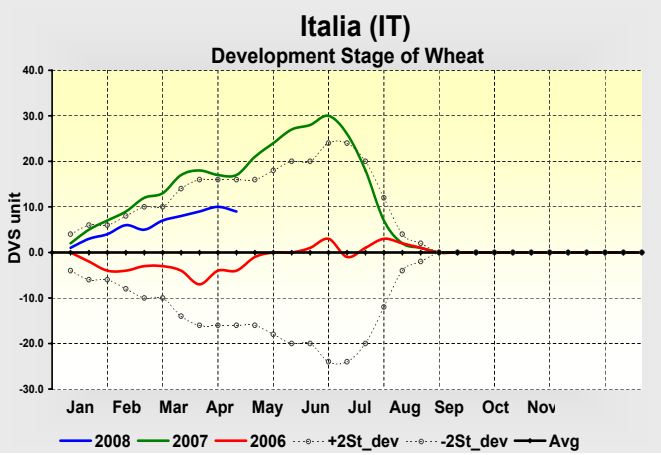


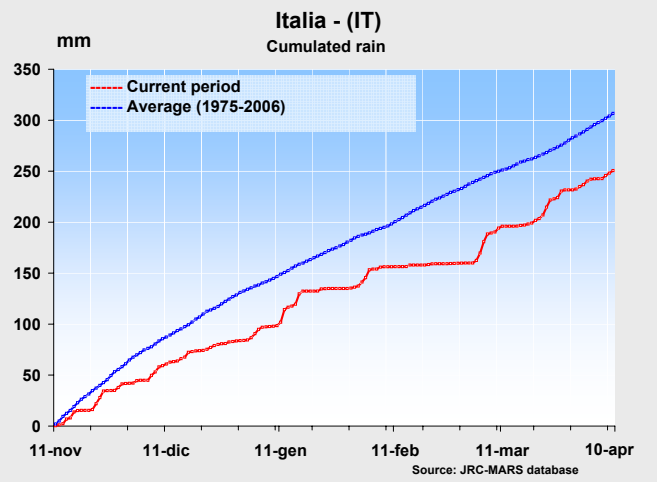


Italy: Anticipated development of winter cereals

There are positive expectations for productivity, driven by a favourable climatic evolution of the season. The yield forecast for soft wheat is 5.11 t/ha (+ 0.2 % compared with the five-year average; + 4.1 % on 2007), 2.81 t/ha for durum wheat (+ 0.9 % compared with the five-year average; + 3.4 % on 2007) and 3.84 t/ha for winter barley (+ 4.9 % compared with the five-year average). For grain maize the expected yield is 9.35 t/ha, exclusively driven by the trend.

October and early November 2007 were rather dry and conducive to regular sowings all over Italy. In the central regions dry conditions continued throughout November and this might have negatively affected the emergence and tillering of winter crops in these areas. There were instead diffused precipitations during late November and December in the north-east as well as in southern Italy and the islands, positively affecting the initial development phases. Temperatures were generally mild and with maximum levels within average. Due to the reduced precipitations, soil moisture remained lower than average from the end of January until mid-February. An irruption of cold air from northern Europe reached Italy on 17–18 February but there was no assessed frost damage. Starting from the first dekad of March, warmer than average temperatures were recorded almost everywhere which caused an early end to the dormancy of winter cereals. Rain returned almost everywhere from March onward and the soil moisture conditions recovered to average levels. The north-western regions were an exception and conditions were very dry. The mild and wet spring favoured good conditions for stem elongation and the estimated potential leaf area index, especially for durum wheat in southern Italy, is higher than average, indicating good conditions for photosynthesis.

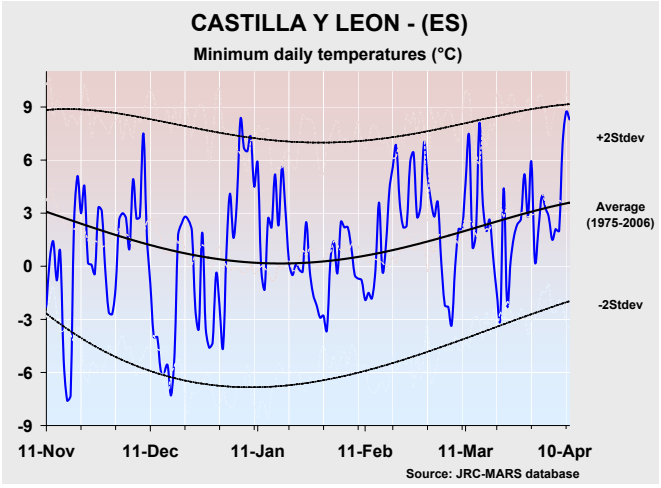


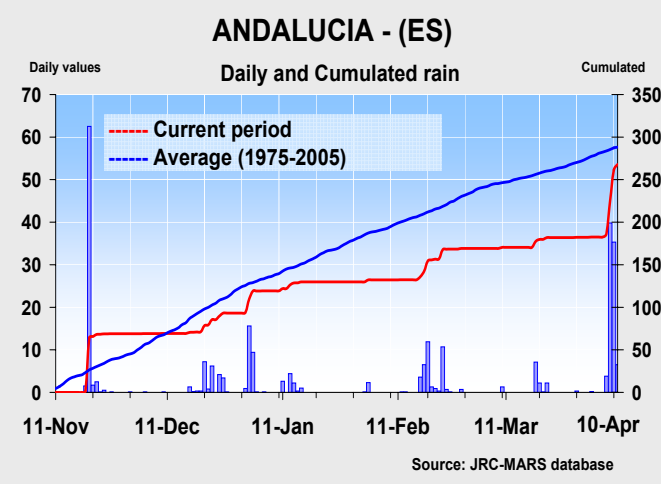


Spain: Dry start to the season followed by significant rains in April

Climatic conditions appear to have slightly negatively affected yield forecast. The estimate for durum wheat is 2.6 t/ha (+ 5.1 % on 2007) and 3.36 t/ha (– 15.4 % on 2007) for soft wheat. The forecast yield for winter barley is 2.8 t/ha (– 12.2 % on 2007) while for spring barley it is set at 3.3 t/ha (– 10 % on 2007). Expectations for grain maize at this stage stand around 9.3 t/ha (– 6.6 % on 2007).

The agricultural season started with two main frost events in November and December in northern and central Spain (Castile-Leon, Castile-La Mancha, Aragon and Catalonia) in the main winter cereal cultivation areas. These events, however, did not significantly affect the first phases of emergence and tillering. From mid-November onward, precipitation was scarce in these areas of Spain and almost everywhere. The winter was relatively mild and dry and this caused an anticipated end to vernalisation in most regions. The water deficit increased until the end of March and was partially compensated by strong precipitations in the second dekad of April, everywhere except for the eastern Mediterranean coast.

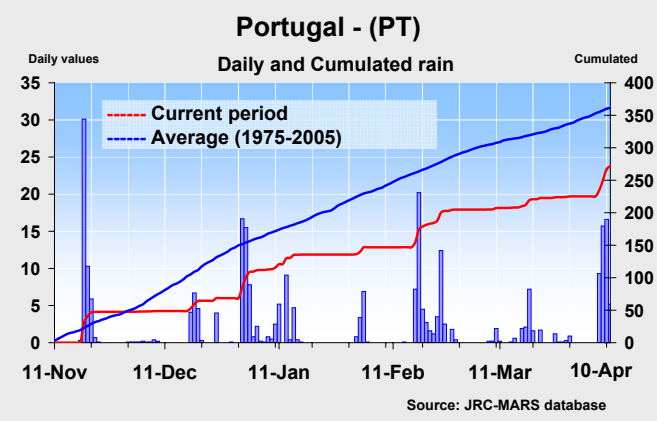


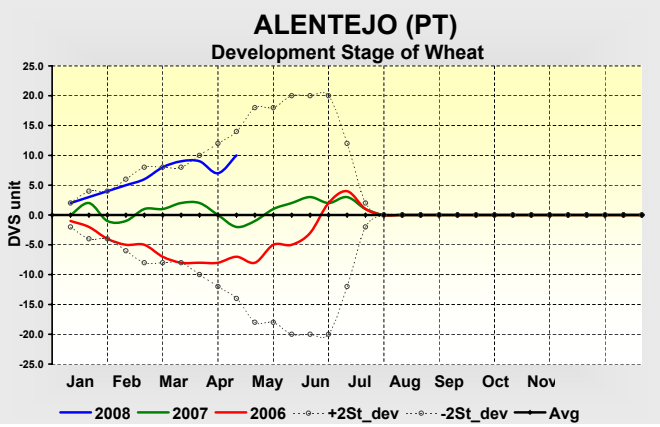


Portugal: Warm and dry weather anticipated development of winter cereal and affects yield expectations

Considering the erratic evolution of the winter climatic conditions, the yield estimate for soft wheat is in the order of 1.57 t/ha (– 3.2 % compared with the five-year average, but significantly lower (– 28.4 %) than 2007). The yield for winter barley is estimated around 1.4 t/ha (– 10.1 % compared with the five-year average and – 24.6 % compared with the 2007 yield). For grain maize the expected yield is 5.56 t/ha, exclusively driven by the trend.

Dry conditions during autumn were not eased by limited precipitation in November creating negative conditions for the germination of winter cereals in the main cultivation area of Alentejo. The drought was carried over to 2008 but this should not have significantly affected the crops as they were in the dormancy phase. From the second dekad of February onwards, precipitations over most of the main agricultural areas of the country eased water shortages. The development stages of winter wheat and barley appear to be more advanced than average, due to the warm and dry conditions. Maximum daily temperatures reached a peak of over 28 °C in Alentejo during the first dekad of April.

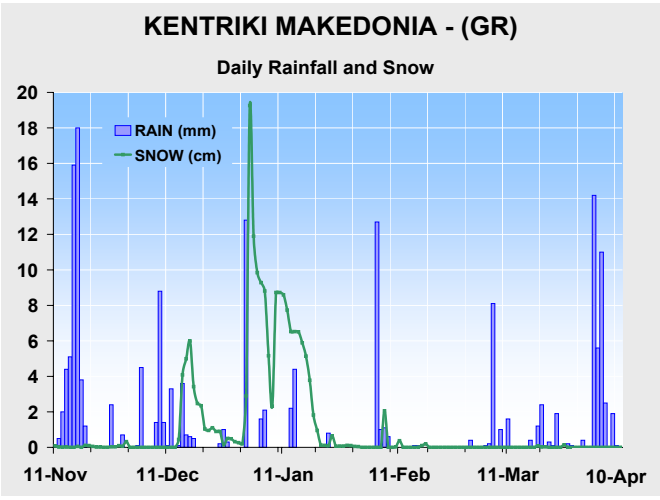


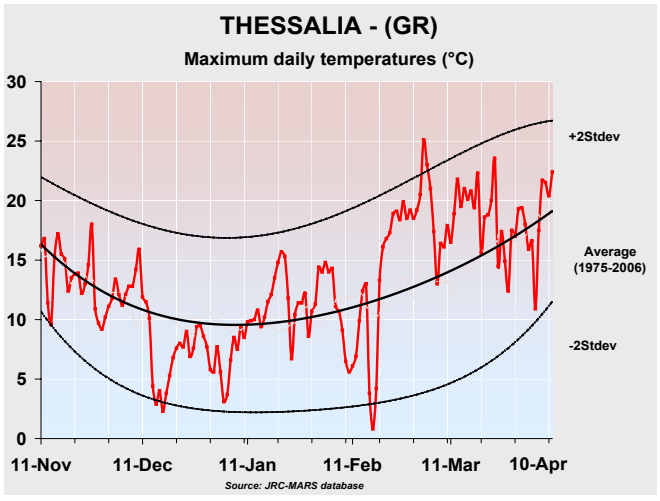


Greece: Cereal production season proceeds smoothly

The beginning of the 2008 season was not characterised by significant events affecting productivity. Durum wheat is forecast at 2.08 t/ha (– 1 % on 2007, + 3.1 % on the five-year average) while soft wheat is expected to yield 2.52 t/ha (+ 1 % on 2007; – 6.6 on the five-year average). Positive forecasts also exist for winter barley: 2.4 t/ha (+ 4.3 % on 2007; + 3.7 % on the five-year average). The estimates for grain maize are affected by the recent dry spell in the production areas and do not account for the availability of irrigation (8.39 t/ha; – 5.8 % on 2007).

The 2007 autumn season was rather wet throughout the main cereal production areas of north and north-eastern Greece. Temperatures remained on the low side throughout the period and this combination can be considered favourable to the initial development stages of winter cereals up to the start of vernalisation. Winter was characterised by significant snowfalls in the north of Kentriki Makedonia as well as in central Greece (Thessalia) although with minimum temperatures still within the norm (~– 10° C). In the first week of March there were diffuse precipitations in north-western Greece, especially in the main barley production areas of Dytiki Makedonia, and maximum temperatures peaked above 20° C, more than 30 % over the average for the season. This trend was conducive to an early start of the shooting stage for both wheat and winter barley. Currently north-eastern and southern Greece are experiencing significant rain, at times exceeding the seasonal averages by over 30 %. Conditions remain rather dry in central Greece without affecting the main cereal production areas. The start of the grain maize cultivation season is also not affected in central Thessalia, which locally benefits from irrigation facilities.





Denmark, Sweden and Finland: General favourable conditions: quite mild winter, only in March some harsh frost events

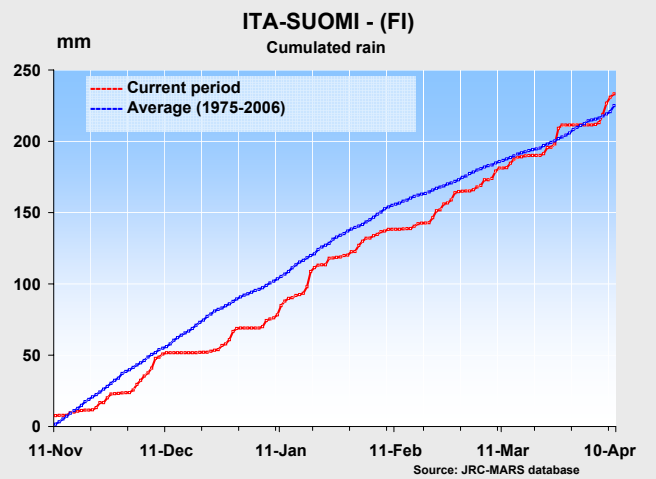
For Denmark, yield forecasts are 6.70 t/ha for soft wheat (+ 1.9 % compared with the previous year), 5.44 t/ha for winter barley (+ 8.1 %), 3.37 t/ha for rapeseed (+ 0.5 %) and 5.04 t/ha for spring barley (+ 1.5 %). For Sweden, yield forecasts are 6.29 t/ha for soft wheat (+ 0.5 % compared with the previous year), 2.57 t/ha for rapeseed (+ 1.1 %) and 4.27 t/ha for spring barley (– 4.3 %). For Finland, yield forecasts are 3.82 t/ha for soft wheat (+ 2.9 % compared with the previous year), 1.37 t/ha for rapeseed (+ 3.6 %) and 3.26 t/ha for spring barley (– 5.4 %).

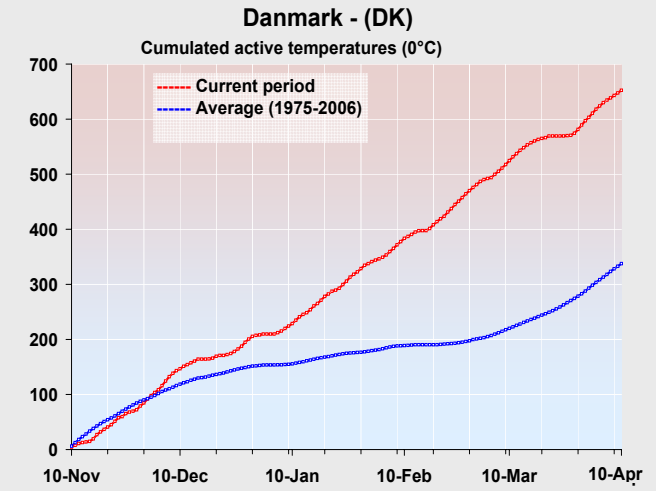
In the three countries, autumn had a seasonal course, even if in December the temperatures were slightly above the average with also some extreme high temperatures (on 28 December, the maximum daily values were around 12 °C above the expected values); the precipitations were below average in November but compensated by the more abundant precipitations that occurred in December.

On the contrary, the winter was characterised by quite mild temperatures, especially in relation to the minimum daily values (which remained almost all the time above the seasonal values), but also the maximum daily values very often reached several degrees above the LTA (in general, 5/6 °C). During this mild winter, the most relevant phenomenon was the brief but sudden drop of temperatures in the last part of March, when the minimum daily values were largely below zero: – 6/– 7 °C with possible damage to new leaves.

Following this mild period, in April again the temperatures were significantly higher than average. Therefore, at the end of the considered period the cumulated GDD showed a significant surplus (especially in Finland): 600–650° GDD as compared with 300–350° GDD as the climatic average. As a consequence, these thermal conditions allowed a very short winter dormancy period and the plants could vegetate with the only constraint being solar radiation, which, however, was very close to the average.

Also the precipitations were quantitatively within the limits of the normal range of variation for the whole period and even their temporal distribution respected the climatic conditions.

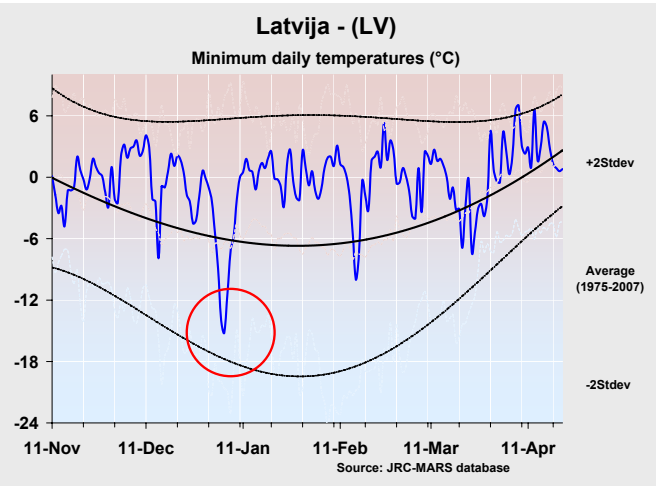




Estonia, Latvia and Lithuania: Exceptional mild conditions

For Estonia the forecast yields are 3.2 t/ha (– 3.8 % compared with previous year) for soft wheat and 2.2 t/ha (– 15.8 %) for barley (total). The figures for Latvia are 3.2 t/ha (– 11 % on 2007) for soft wheat and 2.2 t/ha (– 7.7 %) for barley (total), and for Lithuania 3.9 t/ha (+ 0.3 %) for soft wheat and 2.7 t/ha (1.8 %) for barley (total).

The thermal conditions for Estonia and Latvia were the mildest in the last 33 years. The minimum temperature dropped below – 15 °C only for one to two days (in the southern areas) in the first week of the year. Cumulated rain and global solar radiation were near the long-term averages. Winter crop development is anticipated. The increase in maximum daily temperatures above 10 °C towards the end of March, when the snow layer was still present, may increase the risk of some foliar diseases like *Fusarium nivalis* for rye crops. The rainy weather may prevent an early sowing of spring barley in western Latvia but the canonical sowing period is not yet closed.

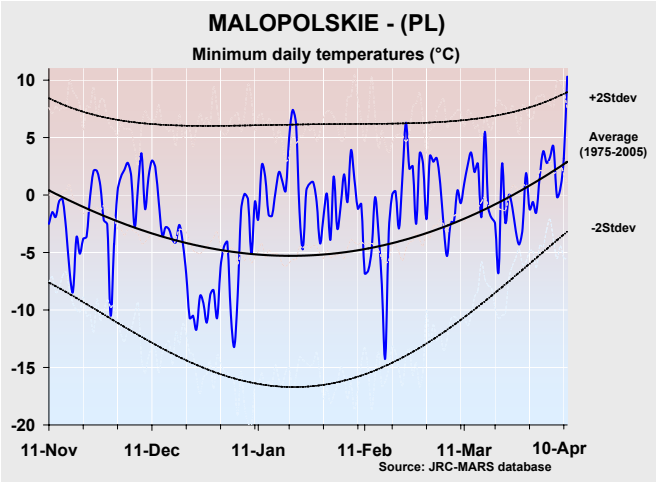


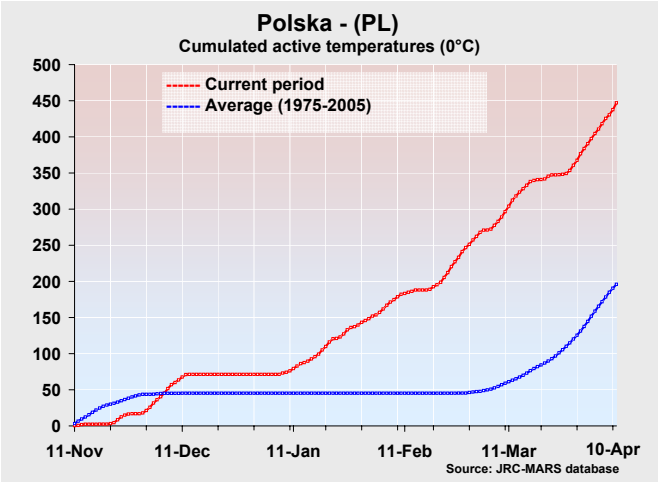
Poland: Warm and humid conditions for first months of 2008

Forecasts are 3.82 t/ha for soft wheat, 3.76 t/ha for winter barley, and 2.70 t/ha for rapeseed. These figures depict a good year compared with the five-year average: yields are 1.8 %, 6.0 % and 5.1 % higher than 2007 respectively for soft wheat, winter barley and rapeseed.

Cumulated precipitations above the long-term average were recorded in the whole country (about 20 %), especially in the north-western regions (Zachodniopomorskie, Lubuskie, Wielkopolskie, Kujawsko-Pomorskie). Cumulated active temperatures (base = 0 °C) are more than double compared with the average, as a result of both maximum and minimum thermal extremes higher than normal. High temperatures and irradiation levels in conjunction with wind-speed values higher than the average for many days have pushed the potential evapotranspiration to above-average values since 20 February. The cold irruption which interested all of central Europe (17 February) could have affected winter crops, especially in the south-eastern regions (minimum temperature reached – 15 °C in Malopolskie).

Winter wheat is completing the tillering phase in the north-eastern regions whereas it has already started the stem elongation phase in the south-western part of the country. In any case, it presents about half-a-month advance with respect to the long-term average. Soil water content is oscillating between average and maximum values, however without causing problems due to soil moisture excess. Rapeseed is in the mid-vegetative phase with a one-dekad advance compared with the average. Favourable thermal and irradiance conditions allowed a precocious development of the canopy: the leaf area index is approximately 40 % higher than the average. Frequent rainfall events in the sowing period for spring barley could have caused problems to the machines' accessibility to fields and therefore delayed sowing.

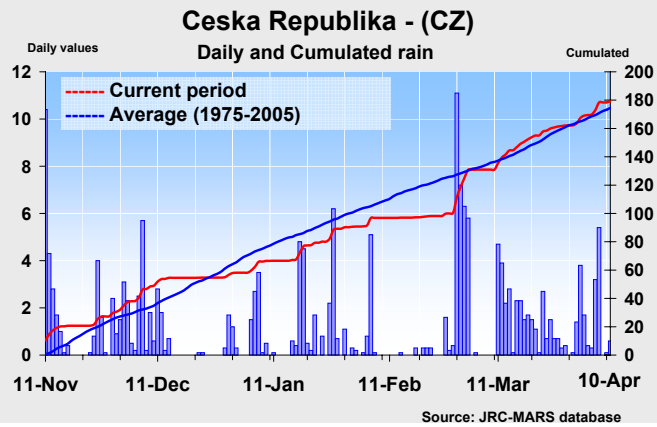




Czech Republic and Slovakia: Mild conditions for winter crops; possible delay in spring barley sowings

Yields forecast for the Czech Republic are higher than the five-year average: 5.04 t/ha for soft wheat (+ 3.7 %), 3.06 t/ha for rapeseed (+ 8.5 %) and 4.62 t/ha for winter barley (+ 9.1 %). Except for soft wheat (3.82 t/ha, – 3.3 % compared with the average), a good potential is shown also for Slovakia: rapeseed and winter barley are forecast to yield, respectively, 2.29 t/ha (+ 12.4 %) and 3.49 t/ha (+ 4.3 %).

Cumulated active temperatures (base = 0 °C) are higher than average, especially because of the warm conditions verified in the first dekad of December and for the period between 8 January and 10 February. These favourable thermal conditions have been coupled with satisfactory irradiance levels, leading to good expectations in this first part of the season, although potential evapotranspiration was slightly below average because of wind-speed values below normal. A cold air irruption (– 13 °C was reached) which occurred on 16–17 February could have affected the crops, which were probably vulnerable because of the warm conditions experienced over the previous days. The situation depicted is similar both in the Czech Republic and in Slovakia, although the latter was characterised by higher irradiance levels and lower, although never limiting, precipitations and temperature.



In the Czech Republic, winter wheat is in the first part of the stem elongation phase (still completing tillering in the north-eastern regions of Slovakia) with about half-a-month advance (10 days in Slovakia) with respect to the average. Soil moisture was enough to fully satisfy the crop requirements. Simulated canopy development is proceeding coherently with average values. Rapeseed entered the second half of the vegetative phase with a one-week advance compared with the average (the advance is limited to a few days in Slovakia). Rainfall, not particularly intense but very frequent, recorded since the beginning of March could have created problems to the field accessibility for spring barley sowings in some region.

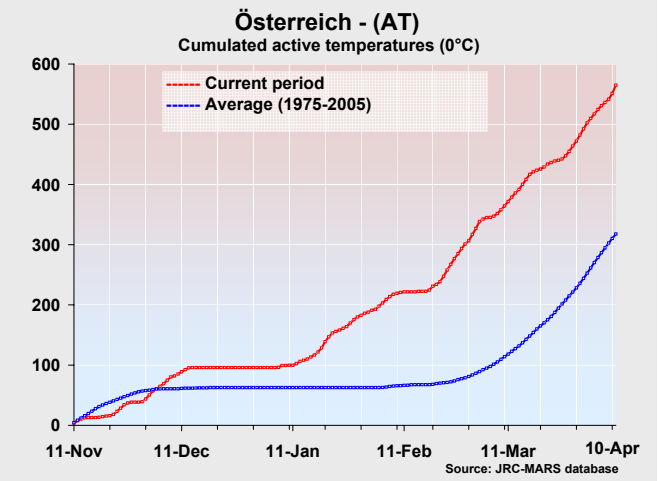
Austria: Slightly advanced development and good yield potential for all crops

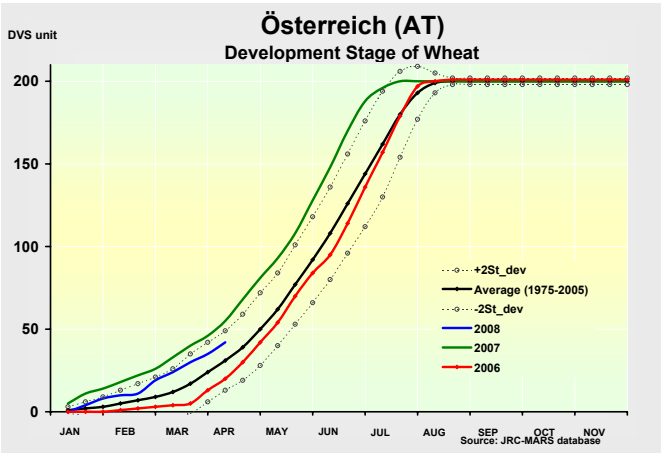
Yield forecasts are 5.15 t/ha for soft wheat (+ 2.1 % compared with the five-year average), 4.14 t/ha for durum wheat (– 2.2 %), 5.39 t/ha for winter barley (+ 1.1 %) and 2.90 t/ha for rapeseed (+ 1.1 %).

Temperatures clearly higher than the average characterised the beginning of the year, especially during the last two dekads of January and the first dekad of February. This has generally pushed winter crops to restart early and vigorously with respect to the long-term average, leading to a considerable advance in development but also to an increased risk of frost damage, additionally accentuated by the snow that has already melted.

The only abrupt temperature fall occurred on 17 February and reached almost 11 °C below zero. However, both the warm conditions and the consequent advance in crop development did not reach the extraordinary levels recorded during the first months of the last year. Normal conditions for rainfall and radiation characterised the inspected period.

Winter wheat is in the first part of the stem elongation phase, with more than a dekad advance compared with the average. Soil moisture conditions are definitely close to the average. The leaf area index is higher than average, indicating good conditions for light interception and photosynthesis, also supported by optimal thermal conditions. Rapeseed is in the last part of the vegetative phase with a dekad in advance compared with the average. Spring barley was sown under optimal soil moisture, avoiding problems of accessibility of machinery to the fields. The mild spring favoured good conditions for germination and emergence.



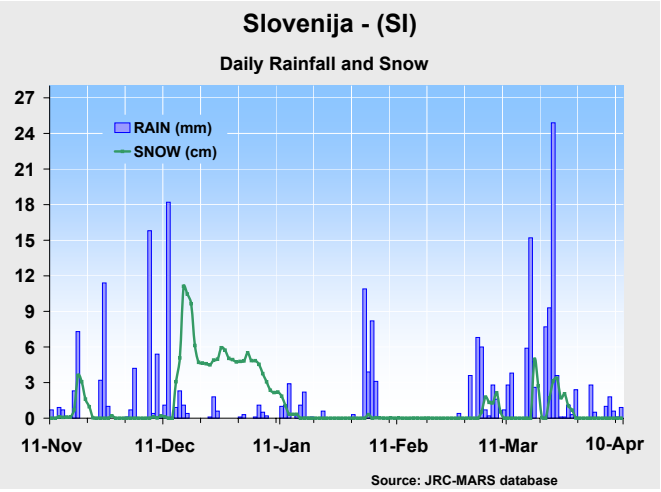


Slovenia: Good conditions for winter cereals

Forecasts are 4.51 t/ha for soft wheat (+ 8.5 % compared with last year) and 3.78 t/ha for barley (+ 3.2 %).

Temperatures higher than the average were recorded since the end of last year. The analysed period was also characterised by a reduced amount of rainfall with respect to the long-term average and by related high values of solar radiation due to the reduced number of cloudy days. The cold air irruption that occurred in February, in correspondence to an absence of snow, may have caused, in some isolate cases, frost damage.

Winter wheat has entered into the second half of the stem elongation phase with more than a one-dekad advance compared with the long-term average. The two-dekad advance in development simulated for rapeseed in mid-March is now reduced to one week. Spring barley is completing the emergence phase according to the average. Young plants could have suffered due to the considerable and daily rainfall events which occurred during emergence.

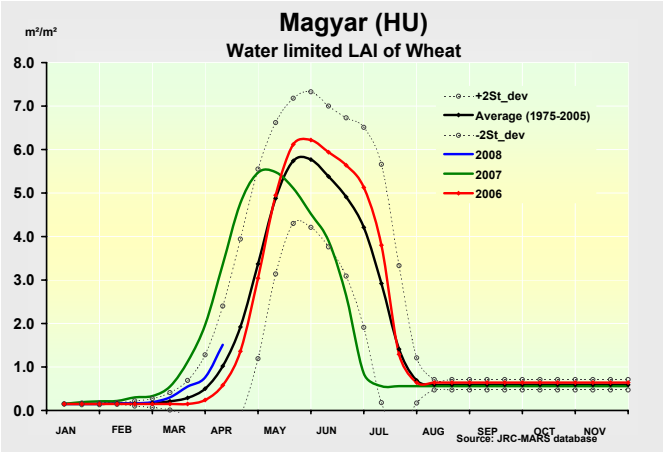


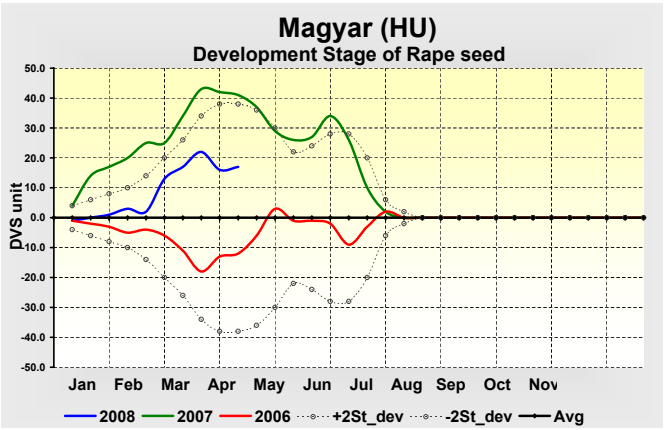
Hungary: Winter crop development one dekad anticipated

A good potential is shown for winter crops: soft wheat and winter barley are forecast to yield, respectively, 3.83 t/ha (+ 6.3 % with respect to last year) and 3.90 t/ha (+ 5.7 %). The forecast for rapeseed is 2.35 t/ha (+ 4.0 %).

Temperatures have been noticeably higher than the long-term average since the beginning of the year, especially because of high daily maximums. Precipitations were scarce over the whole winter season; the related absence of clouds for most of the days has positively influenced the irradiance levels: daily radiation has often been above the average. The scarcity of precipitations occurred especially in the central and northern part of the country, whereas in southern regions the occurrence of significant rainfall events during March pushed cumulated values above the long-term average. The absence of snow coverage may have exposed winter cereals to the risk of frost damage on the occasion of the cold air irruption in mid-February.

Winter crops present an advance in development (more than 10 days), especially in the southern part of the country. Simulated soil water content values are slightly above the long-term average. Winter wheat is in the first part of the stem elongation phase. Rapeseed is concluding the vegetative phase. Winter crops present a leaf area expansion which is higher than the average, especially for wheat (about 50 %). This is explained by the advance in development which is leading to an early closure of the canopy and therefore to an effective interception of solar radiation. Spring barley is in the last part of the emergence phase according to the average.

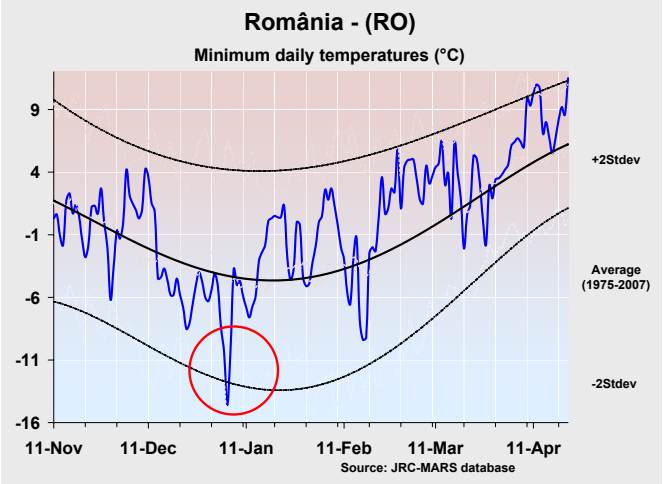


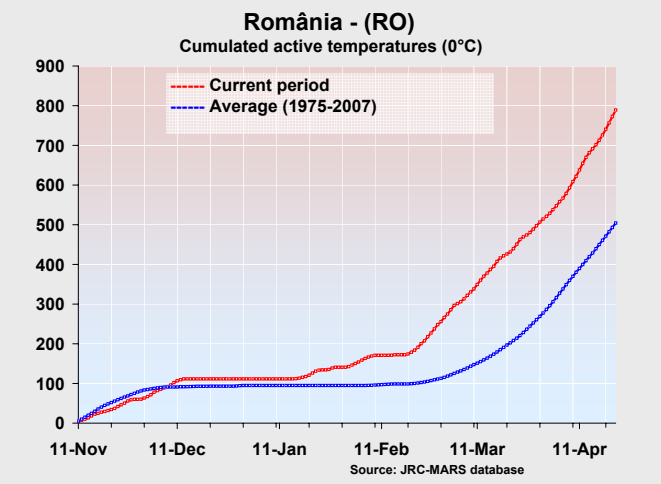


Romania: Relatively mild period with frost spell in January

The forecast yields are 2.5 t/ha (+ 55.9 % compared with the yield of 2007) for winter soft wheat, 2 t/ha (+ 35.4 %) for barley (total) and 1.4 t/ha (– 3.5 %) for turnips (rape).

Starting with the first half of January, the sum of active temperatures (Tbase = 0 °C) for Romania was continuously above the long-term average. The average of daily mean temperature for the whole period of analysis, compared with the last 33 years, was second only to the record of the 2000–01 winter. On 5 January, the minimum temperature dropped below – 20 °C in the eastern areas (Moldova). Meanwhile, in the south-eastern areas, the temperature dropped below – 14 °C for one to two days. For most of the areas concerned by these frost events, it is expected that the snow cover will reduce the negative impact on the winter crops, which at the beginning of the year were still very frost hardened. Cumulated rain and global solar radiation were above the long-term averages. Winter crop development is anticipated. The generally rainy weather from the first half of April allowed several dry days for the sowing of spring crops.

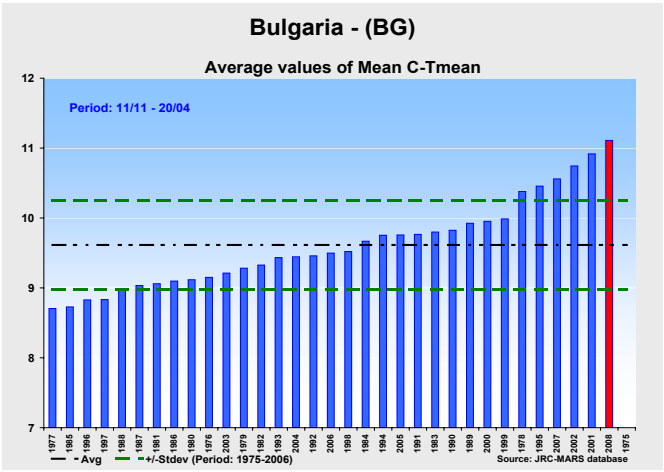


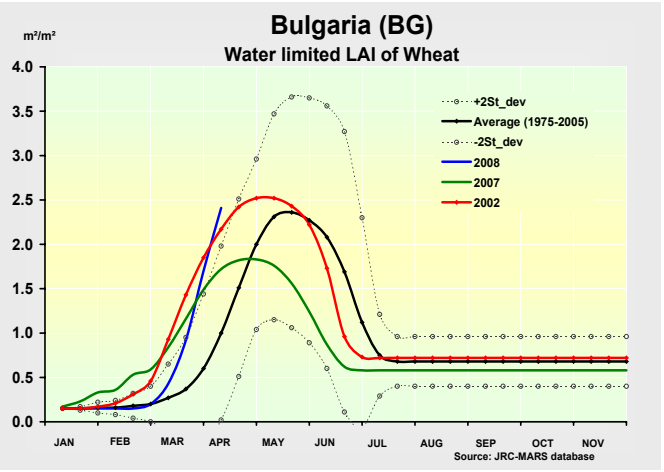


Bulgaria: Mild period with frost spell in January

The forecast yields are 3.3 t/ha (+ 48.7 % on 2007) for soft wheat, 3.2 t/ha (+ 42.3 % on 2007) for barley (total) and 1.9 t/ha (+ 10.7 % on 2007) for rapeseed.

Starting with the last week of February, the sum of active temperatures (Tbase = 0 °C) for Bulgaria was above the long-term average. The average of daily mean temperature for the whole period of analysis was the highest of the last 33 years. On 5 January, the minimum temperature dropped below – 14 °C, but the expected negative impact on the winter crops was reduced due to the snow cover (> 15 cm) and the good physiological status of the crops (hardening). Cumulated rain and global solar radiation were above the long-term averages. Winter crop development is anticipated (one standard deviation above the long-term average), soil moisture is at a normal level and the leaf area index increased visibly after mid-March. Supposing normal conditions for the rest of the vegetation period, at this early stage, the expectations for at least an average yield level of winter crops may be considered. The sowing of spring crops was performed under acceptable to good conditions.





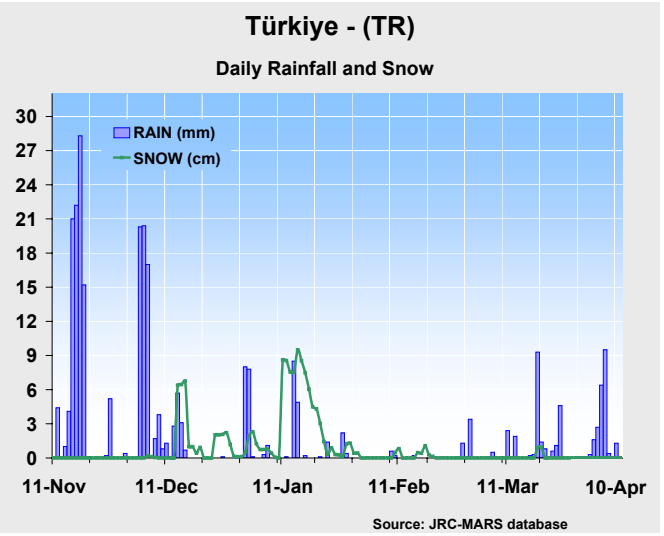
2.2. BLACK SEA AREA

Turkey: Favourable winter season for winter cereals

Meteorological conditions, up to the present, have been favourable for winter cereals and the expected yield for wheat is 2.38 t/ha (up 7.6 % on 2007 and + 5.6 % on the five-year average). A similar trend is estimated for winter barley with an estimated 2.63 t/ha (+ 4.2 % on 2007 and + 4 % on the five-year average).

On the highlands of central Anatolia the start of the agricultural season of winter cereals was favoured by generalised dry conditions at sowing, followed by the onset of diffuse precipitation during November. This particular sequence of meteorological events, combined with temperatures within the norm, is expected to have favoured the emergence and tillering of wheat and winter barley. The period from January to February was characterised by an enduring cold spell in the main cereal production areas of Konya on Ankara. The area experienced scattered snowfalls and the same trend was reported further to the west on the Black Sea coastal regions and in Bati Marmara. Frost is not expected to have had an impact on winter cereals in dormancy.

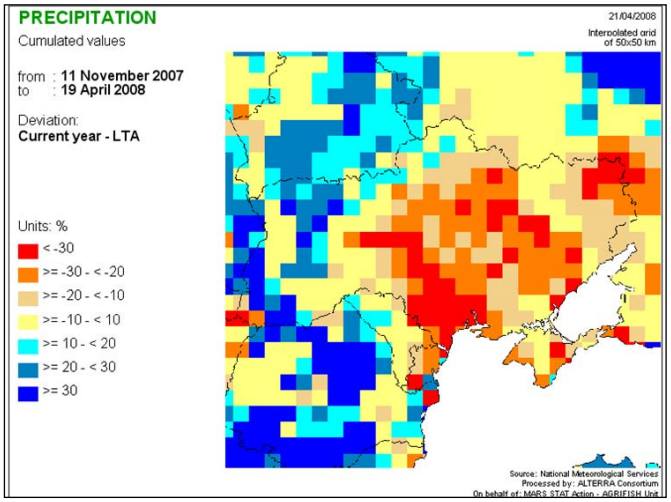
In early March the climatic conditions were markedly different between the north and southern portions of central Turkey. The Black Sea districts down to the central Ankara region received abundant rainfall, with peaks of over 100 mm in cumulated precipitation from mid-March to the present (exceeding by over 30 % LTA). Conditions were drier in the south, down to the Mediterranean coastal regions, however only marginally affecting the core of the cereal production areas. Temperatures, which had been quite low at the same time as the January and February snowfalls, had a significant upturn during March with unseasonal peaks of over 20 °C in areas of central Anatolia. Winter wheat and barley, which were experiencing a certain delay in coming out of vernalisation, took advantage of these conditions, starting the heading phases under good auspices.



Ukraine: Mildest and driest period in last 33 years

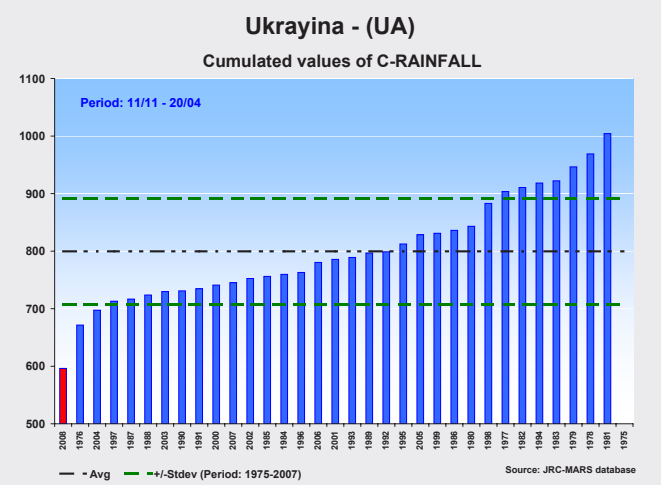
The forecast yields are 2.8 t/ha for wheat, 2 t/ha for barley and 1.2 t/ha for oil seed rape.

The average of daily mean temperature for the whole period of analysis was the highest of the last 33 years. Frost damage is estimated to be low and located mainly in the eastern extremity of Ukraine (minimum temperature below – 23 °C) and maybe in the northern areas (minimum temperature below – 18 °C).



The cumulated rainfall for the considered period is the lowest in the last 33 years.Areas around Nikolaev, and to a smaller extent other areas east of Dnieper, were much drier than normal. The impact of this situation is not yet visible on our simulations but the next 10-day forecast suggests that the situation could become worse.

The development of winter crops is anticipated but to a lesser degree than in the previous year. The sowing of spring crops was performed under dry conditions.



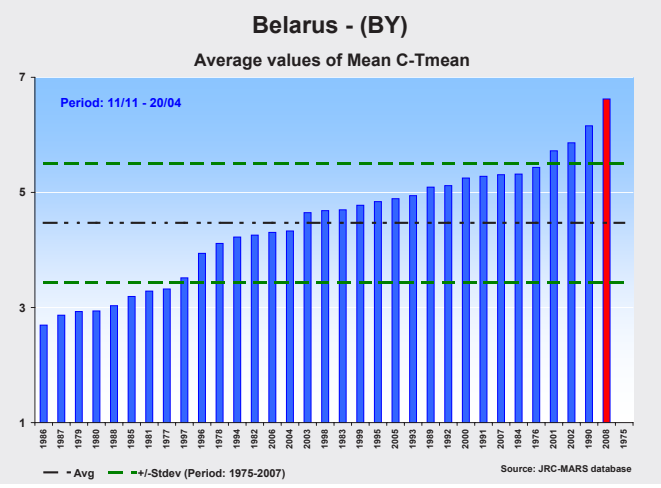
2.3. EASTERN AREA

Belarus: Mildest period in last 33 years

The average of daily mean temperature for the whole period of analysis was the highest of the last 33 years. Minimum temperatures below – 15 °C were recorded all over the country (<– 18° in the northern areas) but this is a normal local winter situation. The level of cumulated rainfall was slightly below the long-term average (somehow drier in the north-western areas).

The development of winter crops is anticipated but to a lesser degree than in the previous year.

The cumulated rainfall after mid-March is exceeded only by the record of 1994, but there were enough dry days for an early sowing of spring crops.



Russia: Favourable conditions for winter crop and for spring crop sowing

The period under analysis is the period when winter crop growth restarts and the time of summer crop sowing.

Due to warm weather during February and March 2008, practically all agricultural fields in the European part of Russia were free of snow at the beginning of April. Only in the northern and north-western part of Russia the snow cover had not disappeared at the beginning of April. In general, snow thawing took place one to two weeks in advance compared with the long-term average.

The winter air temperature was close to normal practically everywhere. Only near the Ural conditions for winter crops were extreme. February and March 2008 were warmer than normal. The air temperature in February was higher than in the previous year everywhere except in the northern Caucasus. In March the temperature was slightly lower than in the previous year; however, it was not extreme for winter crops.

The amount of precipitation was higher than in the previous year in the north-west, and in the northern Volga regions, Dagestan and Rostov *oblast*. In other regions the amount of precipitation was lower. It was slightly worse in the central and central-Chernozemic regions and Krasnodar *kray*, and better in the north-west, Urals and northern Volga regions.

Agrometeorological conditions during winter and spring 2008 lead to a higher soil water content than in the previous year only in north-western region. In the central part of European Russia, Volga and the central-Chernozemic regions, soils contained at the beginning of April 2008 less water than in the previous year. The soil moisture content at the beginning of April was better than normal in the north-western and northern Caucasus regions and worse than normal in other regions of Russia.

The analysis of remote sensing indicators shows that the situation at the beginning of April in general is better than normal. Only in the Kaliningrad region is it close to normal. A worse situation than in the previous year appears only in the north-western region and in some parts of the northern Caucasus region.

Based on analysis of all crop growth indicators, it seems possible to conclude that agrometeorological conditions at the beginning of the current season were in general good for winter crops. Only winter crops in the Urals region are likely to be seriously affected by winter frost. The agrometeorological situation for summer crop sowing was favourable practically everywhere, and the sowing campaign is likely to be finished without delay.

3.4. MAGHREB

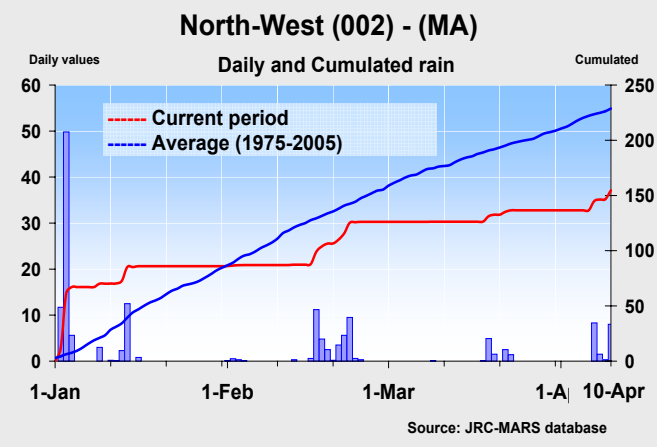
Maghreb: Reduced expectations in Morocco and positive forecasts to the east in Algeria and Tunisia

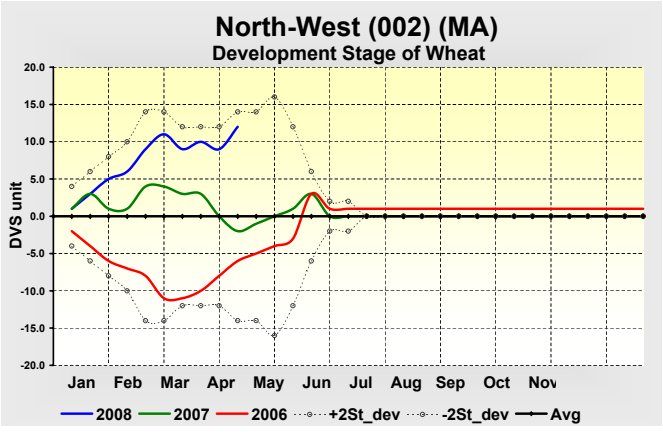
The expected yield for Morocco is 1.17 t/ha for wheat (+ 31.91 % on 2007 but still – 11.32 on the five-year average); barley is estimated at 0.7 t/ha (same as in 2007 and – 15.71 % on the five-year average). In Algeria wheat is forecast at 1.29t/ha (+ 31.8 % on 2007 and + 5.9 % on the five-year average); for barley expectations are 1.46 t/ha (+ 4.1 % on 2007 and 0.84 % on the five-year average). In Tunisia wheat is forecast at 1.79t/ha (– 0.56 % on 2007 and + 1.8 % on the five-year average) and barley at 0.941 t/ha (+ 12.86 % on 2007 and – 41.5 % on the five-year average).

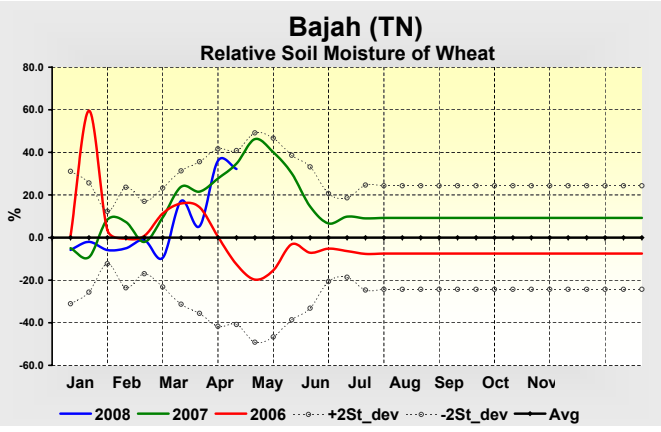
In Morocco the beginning of the 2007–08 agricultural season was characterised by dry weather and mild temperatures in the most important winter cereal production areas of the centre-west. These protracted drought conditions were not favourable for the initial development stages of winter cereals. There were some erratic precipitation events from January to the present which did not compensate for the protracted water deficits. Higher-than-average temperatures in mid-February and March triggered an anticipated development of wheat and the crop is at present reaching the pre-flowering phase. Overall conditions, although better than in 2007, are not conducive to a positive outcome of the season and the average yield is estimated at present below 1.2 t/ ha, improving on 2007 (+ 32 %) but still over – 11 % on the five-year average.

In Algeria the start of the season was favourable to cereal germination and tilling. There were sufficient precipitations in the north-east of the country, over the main agricultural areas, which kept a sufficient moisture supply for cereals during shooting and stem elongation phases. The productivity expectations are good for wheat and yield is forecast at around 1.3 t/ha with a significant improvement both on the 2007 season and the five-year average (+ 6 %). The barley yield is expected to remain stable within the norm. The forecast is 1.5 t/ha, slightly higher than in 2007 (+ 4 %).

Conditions appear to be even more stable further to the east, in Tunisia. Temperatures were within the norm during the winter and sufficient precipitation kept a constant moisture reserve in the soil. These conditions appear favourable for cereals in their central development stage. Wheat yields are expected to remain stable at the same levels of 2007, with 1.8 t/ha. Barley is expected to improve significantly from 2007 (0.85 t/ha) although it is still well below the five-year average.

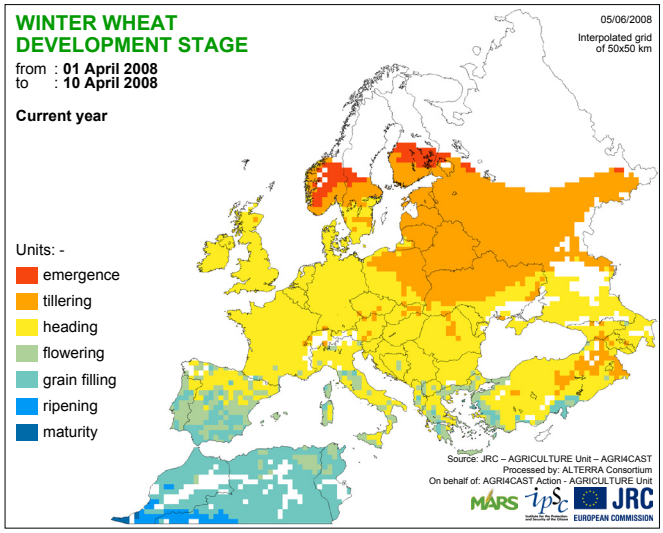


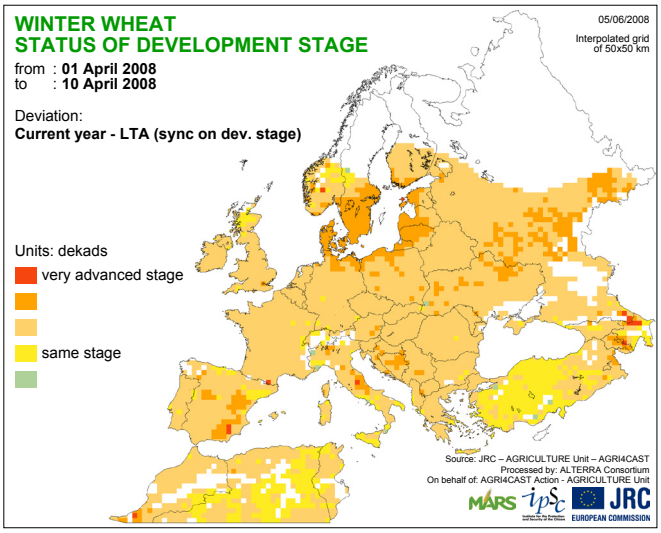


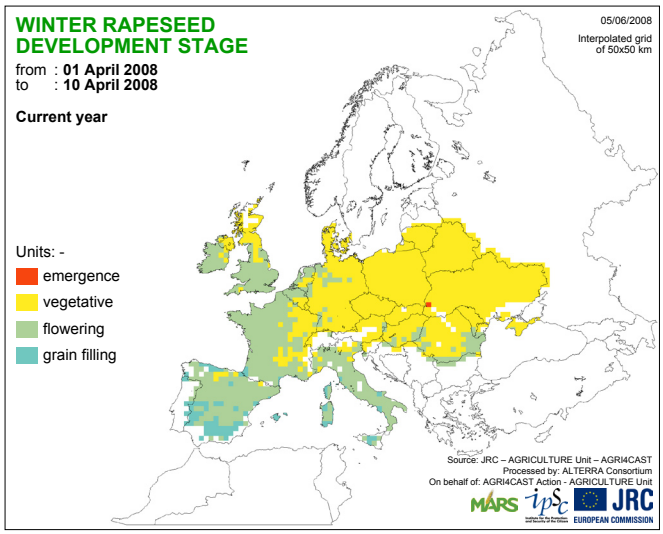


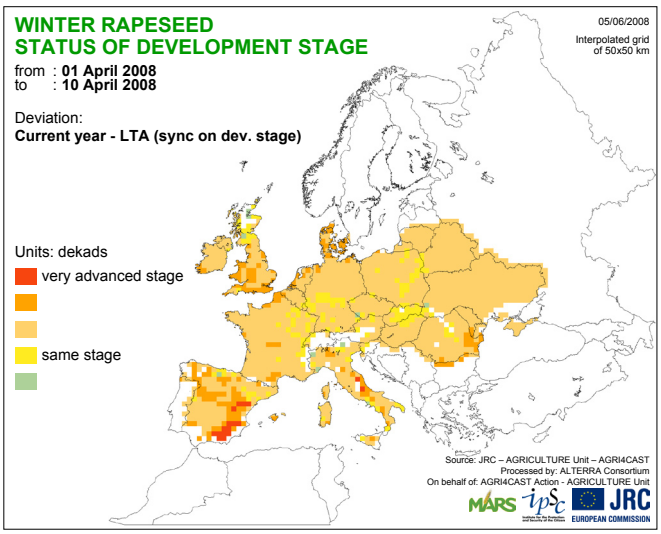
3. Maps analysis

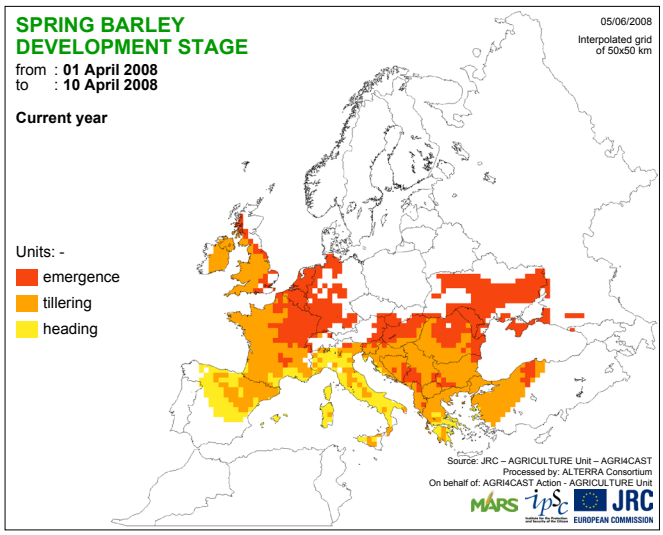
3.1 Crop development

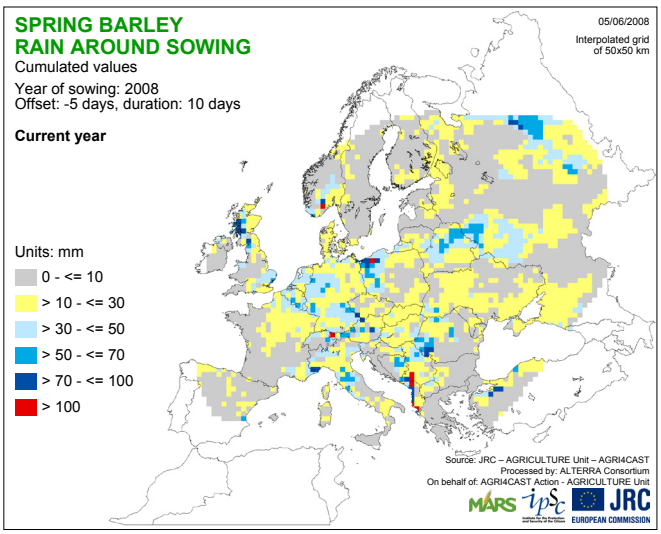




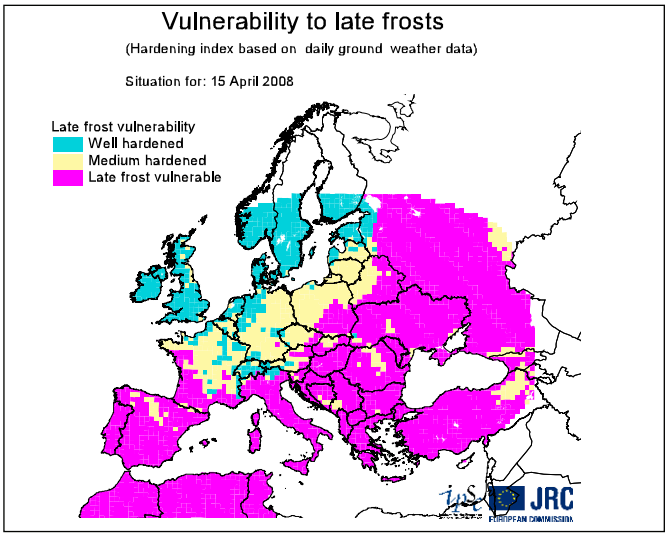


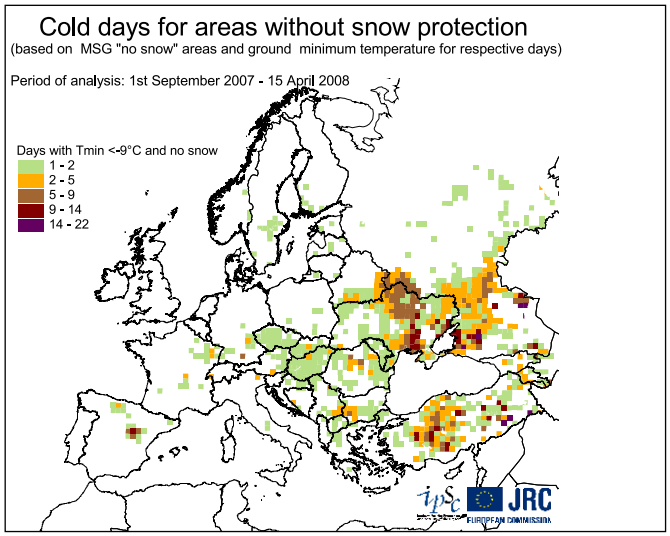


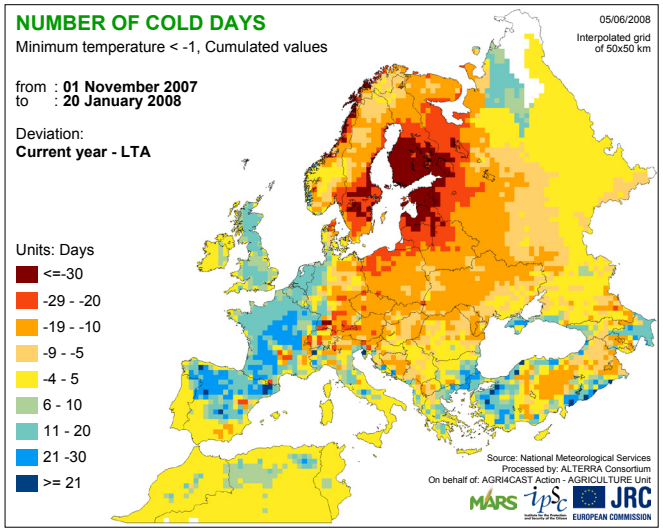


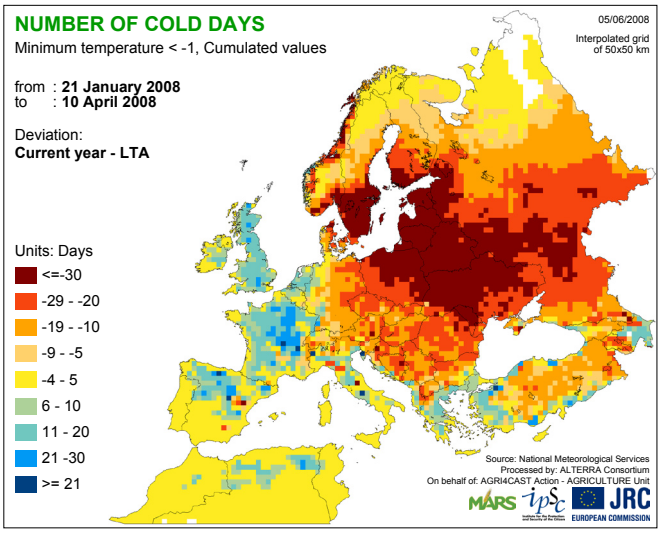


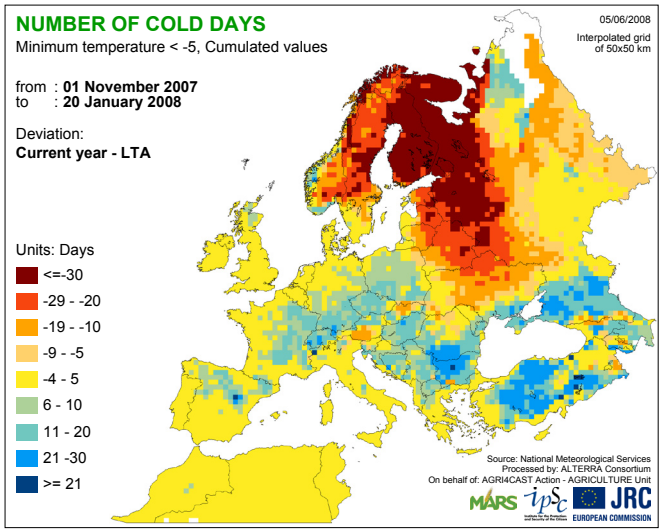
3.2 Frost analysis

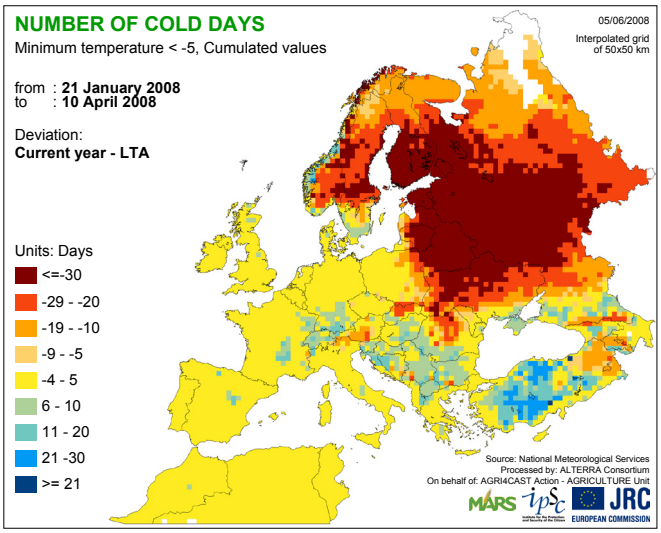




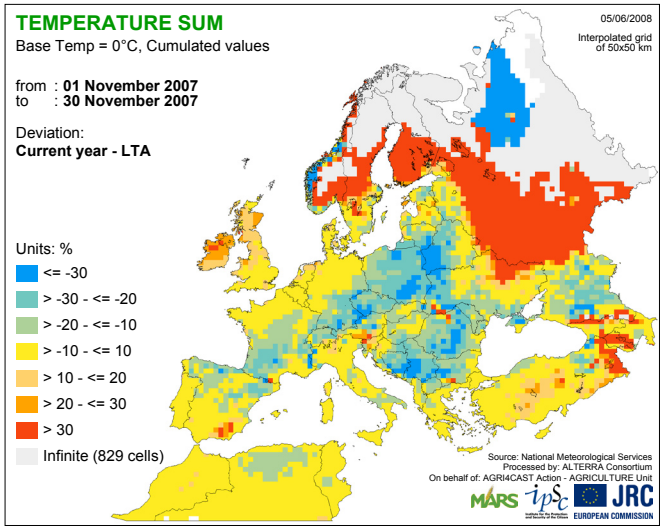


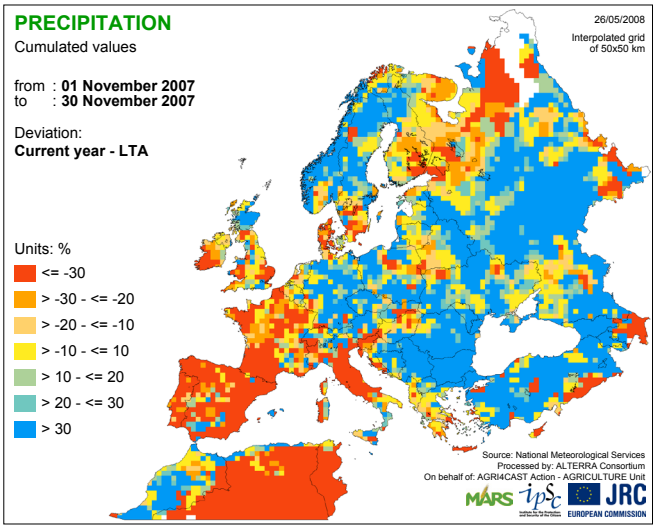


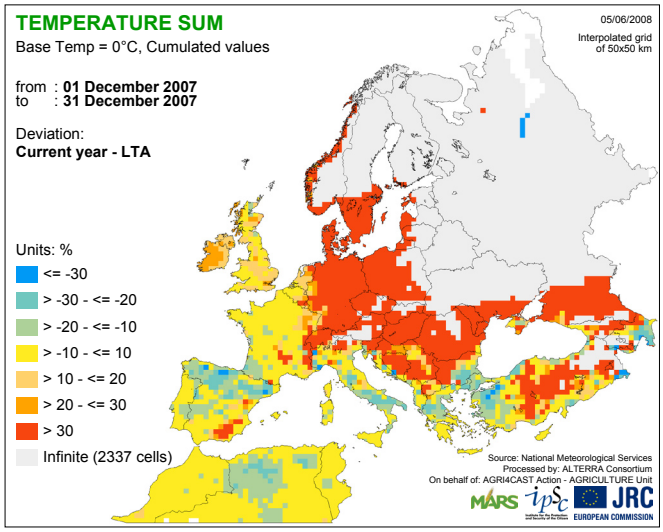


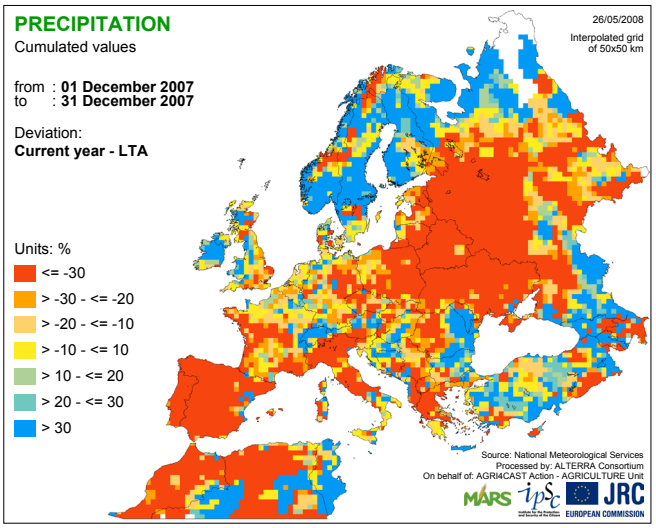


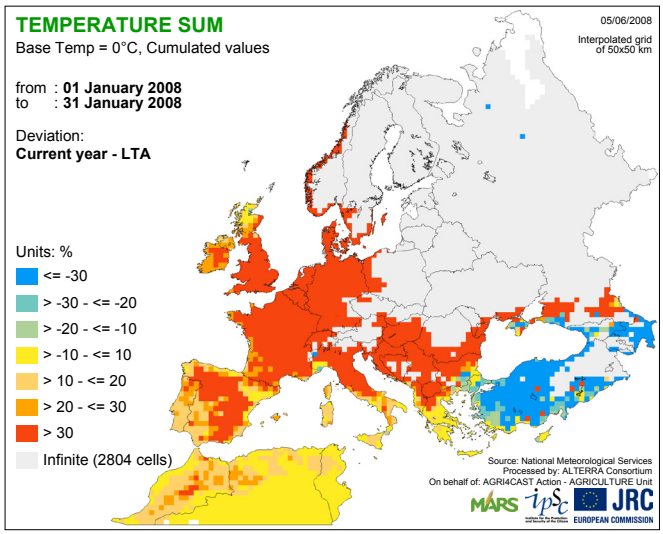
3.3 Temperatures and precipitations

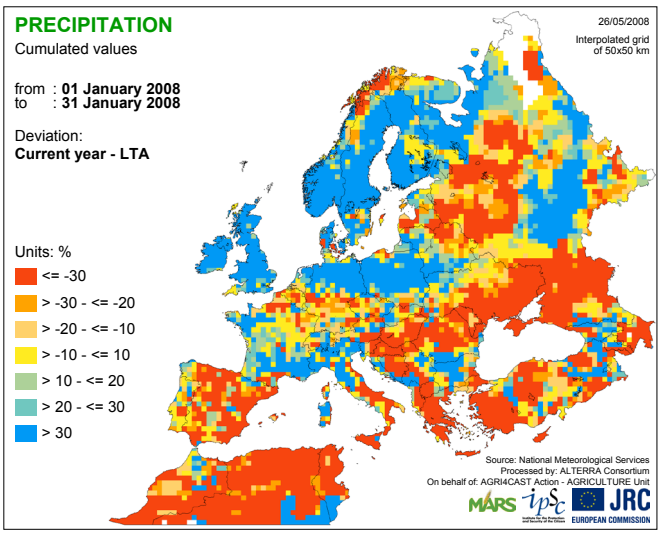












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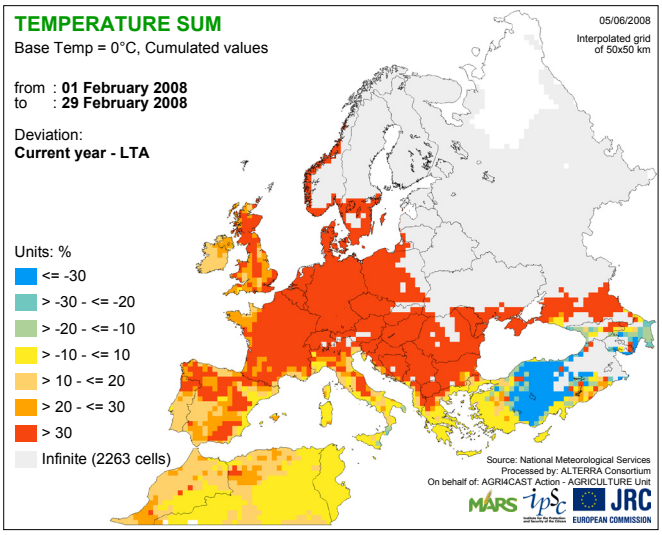
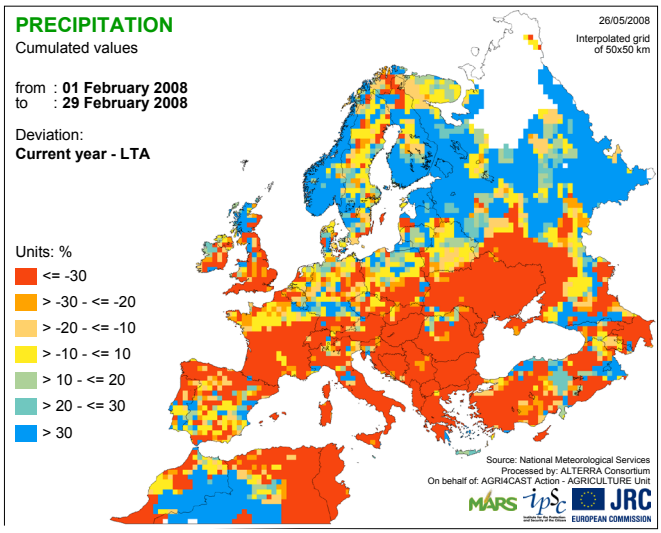
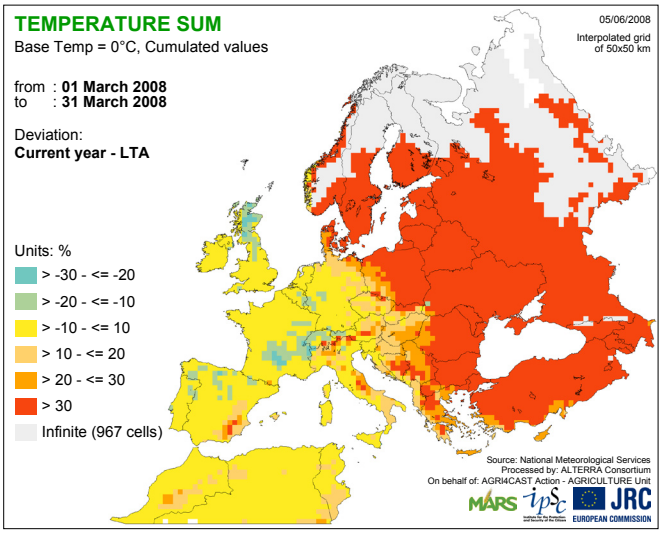
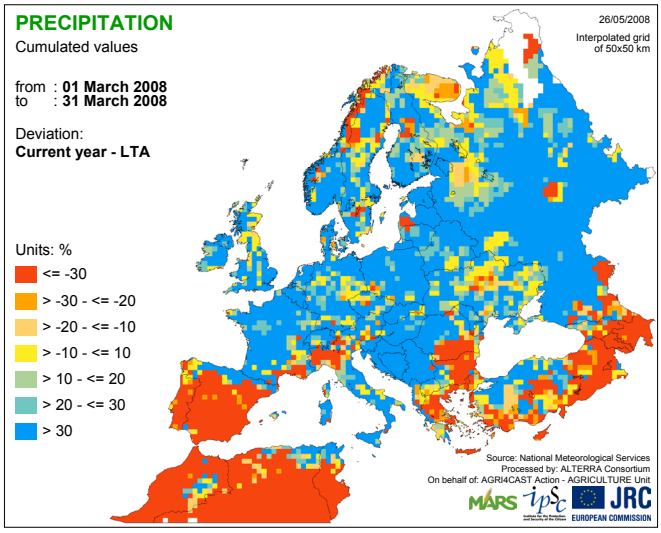
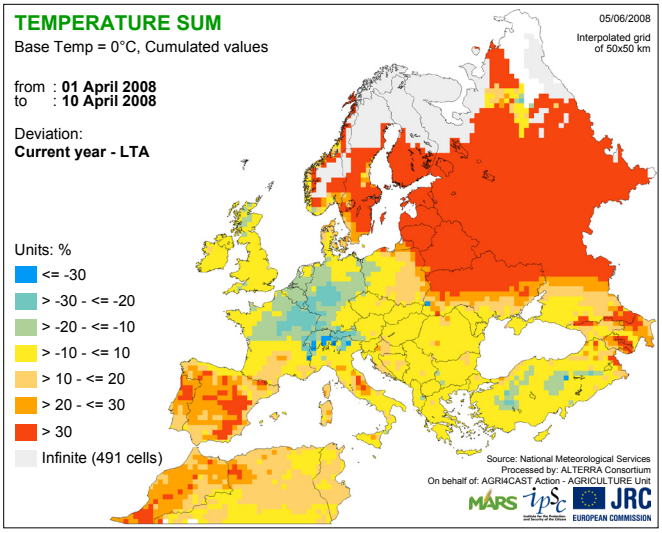
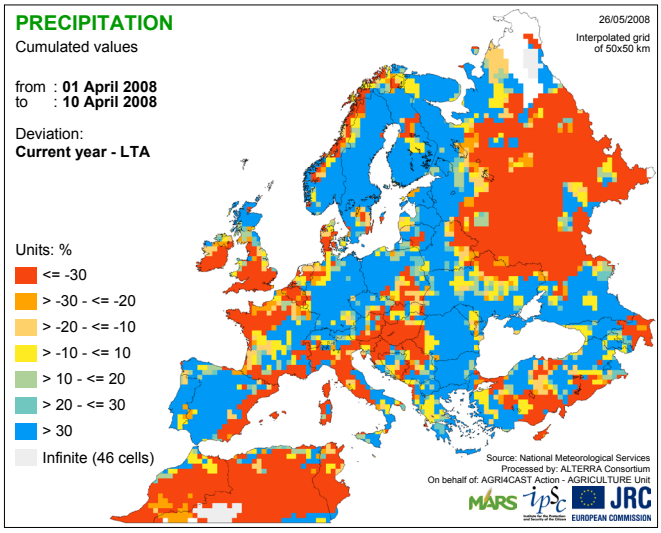






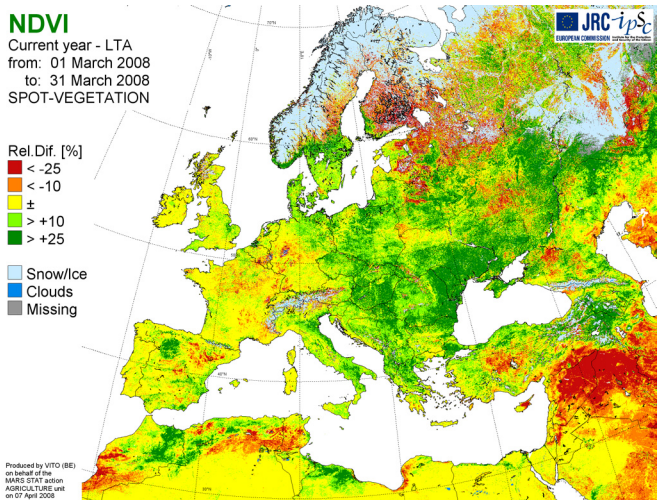






4. Satellite analysis — SPOT vegetation

Normal NDVI profiles for most of Europe, anticipated development particularly in the eastern countries



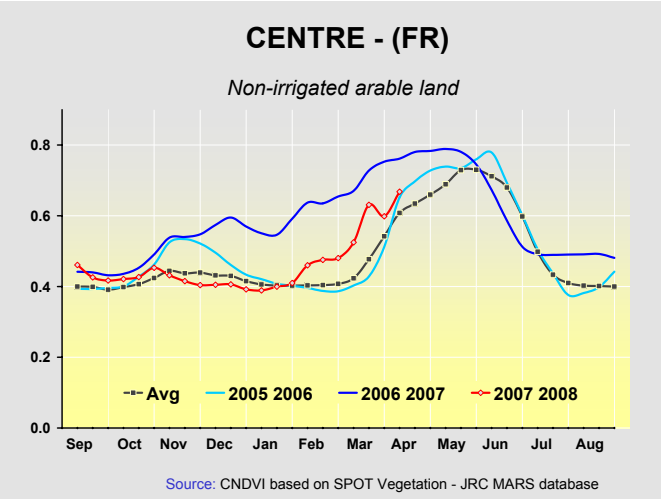
The normalised difference vegetation index (NDVI) map shows relative differences between current NDVI and the long-term average (1998–2006) for March 2008. For most of western Europe, NDVI exhibits normal values around the long-term average. Slightly higher positive NDVI differences are visible in extensive parts of eastern Europe, from Germany and Italy eastwards. A favourable situation is shown for countries bordering the Black Sea (e.g. Romania, Ukraine) due to warmer than usual temperatures during winter.

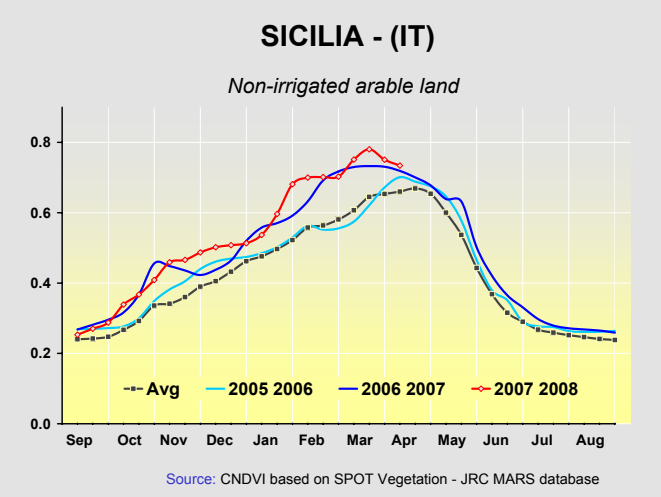
The split situation for Europe is documented in the **NDVI profiles** of non-irrigated arable land as well. West European countries like France (see profile of centre region) and Spain (see profile of Castile-La Mancha) have NDVI profiles around the average. An exception is the region including Castile-Leon (Spain). Here the NDVI displays an anticipated growth of two dekads compared with the average (see profile). The vegetation boost has almost reached its maximum. Germany shows an average to early start of the regrowth. The latter, combined with a positive development in the first part of the growing period, allows good yield expectations in Nordost Brandenburg.

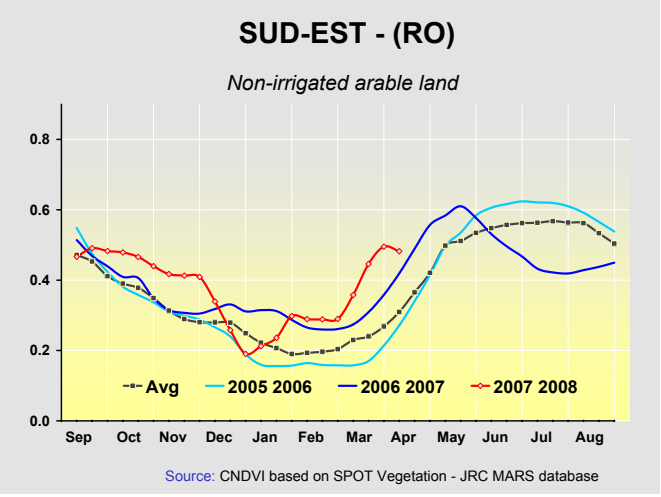
A fair to good start of the season can be found in **Italy**. Particularly, the north-east (e.g. Emilia-Romagna) and the south (e.g. Puglia and Sicilia) are facing an early well-developed growing period. The profile for **Sicilia** documents an advanced cycle and a vegetation maximum clearly above the average and previous years. The yield potential is good. Also for **Greece**, relatively high NDVI values are displayed for the season combined with a steep vegetation boost from early March onwards.

The higher differences in the region of the north-west coast of the Black Sea are caused by anticipation early in the growing season. It becomes visible in the profiles of **Romania** and **Ukraine**. An example is given by the south-east (Romania). At the moment the profile still allows a full potential yield, but the anticipation can lead to a shortened crop cycle, thus diminishing yield expectations.

The **Maghreb** countries face a slightly more favourable situation than last year. Extensive parts of arable land are characterised by NDVI profiles that range around the average. For the eastern region of Morocco, they exhibit even exceptional values above the average.







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